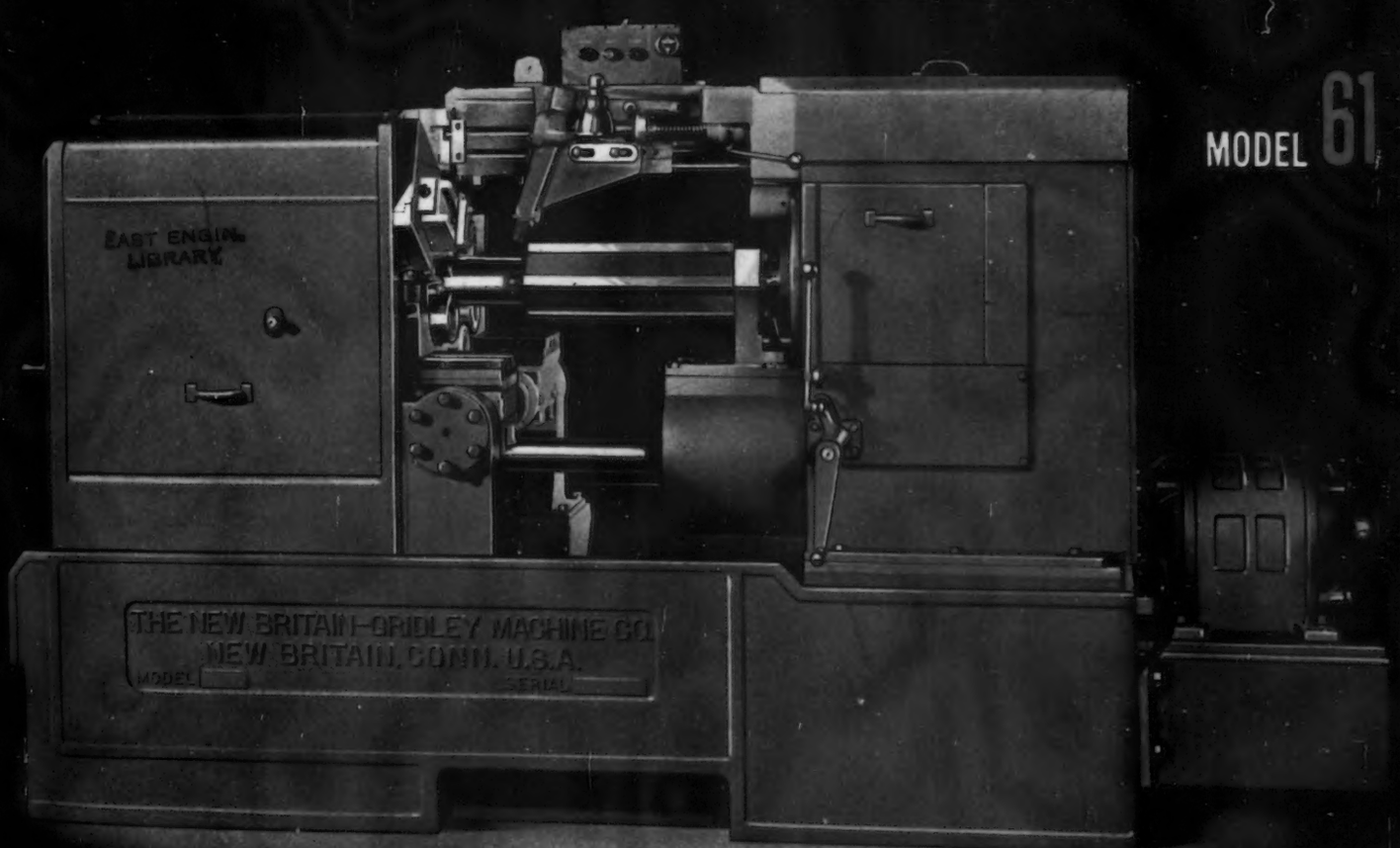
JULY 2, 1936

THE IRON AGE

Another Hit by New Britain!

A New Series
of Six Spindle Automatic Screw Machines
up to 2¼" Capacity
also
Four Spindles up to 3" Capacity



Also a complete new line of Chuckers — 4 and 6 Spindles up to 9" Capacity

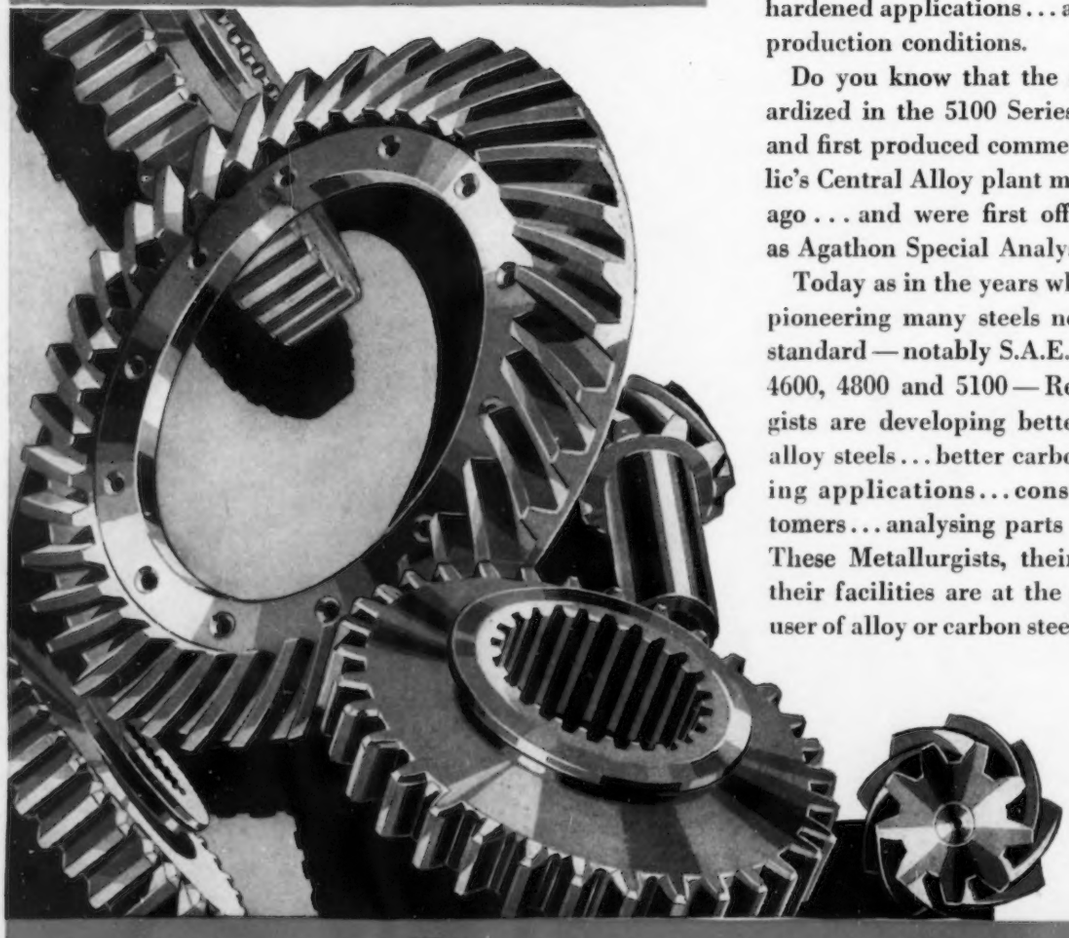
THE NEW BRITAIN-GRIDLEY MACHINE COMPANY

NEW BRITAIN, CONNECTICUT, U.S.A.

S·A·E· 5100

a Modern Steel

WITH MORE THAN 15 YEARS OF PROVED BACKGROUND



● We hear much these days of S.A.E. 5100 steels . . . their oil hardening qualities . . . easy annealing . . . excellent machineability . . . genuine economy. And they are fine steels—ideal for gears and many oil hardened applications . . . adapted to today's production conditions.

Do you know that the steels now standardized in the 5100 Series were developed and first produced commercially in Republic's Central Alloy plant more than 15 years ago . . . and were first offered to industry as Agathon Special Analyses Steels?

Today as in the years when Republic was pioneering many steels now recognized as standard—notably S.A.E. 6100, 4100, 4300, 4600, 4800 and 5100—Republic Metallurgists are developing better steels . . . better alloy steels . . . better carbon steels . . . studying applications . . . consulting with customers . . . analysing parts and their design. These Metallurgists, their experience and their facilities are at the disposal of every user of alloy or carbon steel. Write Dept. IA.

REPUBLIC STEEL

Republic Steel CORPORATION

ALLOY STEEL DIVISION, MASSILLON, OHIO

GENERAL OFFICES: CLEVELAND, OHIO

THE IRON AGE, published every Thursday by the *CHILTON CO., (INC.)*, Chestnut & 56th Sts., Philadelphia, Pa. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 138, No. 2.

THE IRON AGE

CHESTNUT AND 56TH STREETS, PHILADELPHIA, PA.
Sales Offices
239 WEST 39TH STREET NEW YORK, N. Y.

FRITZ J. FRANK, *President*

J. H. VAN DEVENTER
Editor

T. H. GERKEN
Managing Editor

A. I. FINDLEY
Editor Emeritus

R. E. MILLER, *Machinery Editor*
F. J. WINTERS, *Art Editor*
T. W. LIPPERT, *Metallurgical Editor*

L. M. WAITE, N. E. MACMILLAN, R. G. BINGHAM, G. RICCIARDI

L. W. MOFFETT, *Washington*
R. A. FISKE, *Chicago*
F. L. PRENTISS, *Cleveland*
T. C. CAMPBELL, *Pittsburgh*
F. J. OLIVER, *Detroit*

Contents — July 9, 1936

The Editor's Page 33
Tooling Axle Shafts for Low-Cost Production 34
The Unemployed Versus the Machine 40
Electrical Control Features Plate Planer 44
How Large Buyer Purchases Machine Tools 49
Begins Making New Sealless Air Conditioning Unit 52
Trends in Foundry and Machine Shop Accounting 56
Steel Output in First Half Above 15-Year Average 60
Modern Finishes Dress Up Machine Tools 62
Testing Materials Society Meets at Atlantic City 64
Automotive Industry 66
Statistics on Metal-Working Activity 70
Rate of Activity in Capital Goods 71
Washington News 72
NEWS CONTENTS 88
Products Advertised 157
Index to Advertisers 182

Copyright 1936 by Chilton Company (Inc.)

Owned and Published by

CHILTON COMPANY
(Incorporated)

Executive and Publication Offices,
Chestnut and 56th Sts., Philadelphia, Pa.

C. A. MUSSELMAN, President
FRITZ J. FRANK, Executive Vice-President
FREDERIC C. STEVENS, Vice-President
JOSEPH S. HILDRETH, "
GEORGE H. GRIFFITHS, "
EVERIT B. TERHUNE, "
ERNEST C. HASTINGS, "
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary

C. S. BAUR, *General Advertising Manager*
A. H. DIX, *Manager Reader Service*

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50, including duty; Foreign $12.00 a year. Single copy, 25 cents.

Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 621 Union Bldg., Cleveland
B. L. Herman, 675 Delaware Ave., Buffalo, N. Y.
H. K. Hottenstein, 802 Otis Bldg., Chicago
Peirce Lewis, 7310 Woodward Ave., Detroit
Charles Lundberg, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
W. C. Sweetser, 239 West 39th St., New York
D. C. Warren, P. O. Box 81, Hartford, Conn.

Principal Products Always in Stock

Beams and Heavy Structurals
Channels, Angles, Tees and Zees
Rails, Splices, Spikes, Bolts, etc.
Plates, Sheets
Cold Finished Shafting
Strip Steel, Flat Wire, etc.
Stainless Steel
Hot Rolled Bars, Hoops and Bands
Extra Wide Cold Finished Flats
Alloy Steels, Tool Steels
Heat Treated Alloy Steel Bars
Boiler Tubes and Fittings
Welding Rod, Mechanical Tubing
Rivets, Bolts, Nuts, Washers, etc.
Concrete Reinforcing Bars
Babbitt Metal and Solder

Immediate Shipment Assured

Ryerson Sheets—more than twenty-five kinds—are but one unit of the wide range of stocks carried for Immediate Shipment. There is hardly a product in the finished steel and allied lines that you cannot secure at once from the nearest Ryerson plant.

Special handling, cutting and dispatching facilities and an experienced organization assure prompt shipment of your order.

The Ryerson Stock List is the guide to these large stores of steel. If you do not have the current issue, write and we will send it.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, Cleveland, Detroit, Cincinnati, St. Louis, Boston, Buffalo, Philadelphia, Jersey City

RYERSON

▲▲▲ THE IRON AGE ▲▲▲

JULY 9, 1936

ESTABLISHED 1855 Vol. 138, No. 2

Who Are the Economic Royalists?

PRESIDENT ROOSEVELT, in accepting the renomination for President at Philadelphia, made a noteworthy speech. It was a "fighting" speech; an urge to rally 'round the flag of the righteous and do battle to the death with the "economic royalists" of America.

Many of his hearers and readers thought that the President should have named the enemy against which he has drawn this new Declaration of Independence. Most of us know, of course, that the banners of righteousness are those carried by the cohorts of the New Deal, under the grand marshalship of James A. Farley, aided by general staff members Frankfurter, Tugwell, Ickes, Hopkins *et al.*

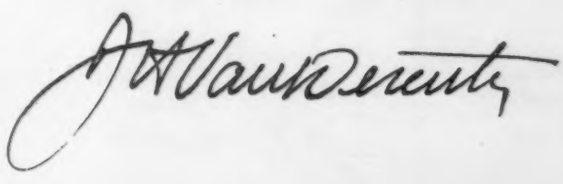
But who are the "economic royalists"? It is a bit dangerous for the commanding officer not to tell his followers what sort of uniform the enemy wears. Some of their guns might be trained upon the wrong parties!

It would be natural, for example, for the average man to consider that an "economic royalist" was one who had obtained, by one means or another, such individual and despotic power over the lives and living of his fellow men as to constitute a threat to that personal and economic freedom envisaged by our forefathers.

But that definition of the enemy would not be a safe one for the New Deal forces. It might cause their guns, for example, to be turned upon John L. Lewis, who in addition to being the absolute labor monarch of coal, now seeks to add steel and automobiles to his royal kingdom. Our "founding forefathers" certainly would not have contemplated, with equanimity, the possible rise to dominating power, unhampered by law, of such an "economic royalist."

Indeed, under the average man's conception of an "economic royalist" as one who has seized unwarranted and despotic power, the guns of the public, so eloquently urged to battle, might be turned against the inner coterie of the New Deal itself. For economic royalty need not wear the crown if it holds the scepter, and American history records no parallel to the assumption of power over the lives and livings of our people by the "economic royalists" now in Washington.

Before inviting the people to shoot, it would be well, Mr. President, to clearly define the target.



Tooling Chrysler Axle Shafts

o o o

By FRANK J. OLIVER
Detroit Editor, The Iron Age

o o o

TO reduce machining costs to a minimum, the Chrysler Corp., Detroit, has recently completed at its Jefferson Avenue plant an installation of up-to-the-minute machinery and heat-treating equipment for machining rear axles for its six-cylinder cars, including Plymouth, Dodge, DeSoto and Chrysler. While a few older machines formerly used on these operations are still on the line, the equipment is for the most part brand new and has just recently gone into full production. It represents, therefore, the latest practice in machining, heat-treating and cleaning methods. Like many other automotive layouts in recent years, the heat-treating equipment is installed right in the machine line, so there is no backtracking nor lost motion in material handling.

The material from which these rear axle shafts are made is a special Chrysler molybdenum steel containing 0.60-0.65 per cent carbon. The shaft reaches the machine line rough forged to shape and in a normalized condition.

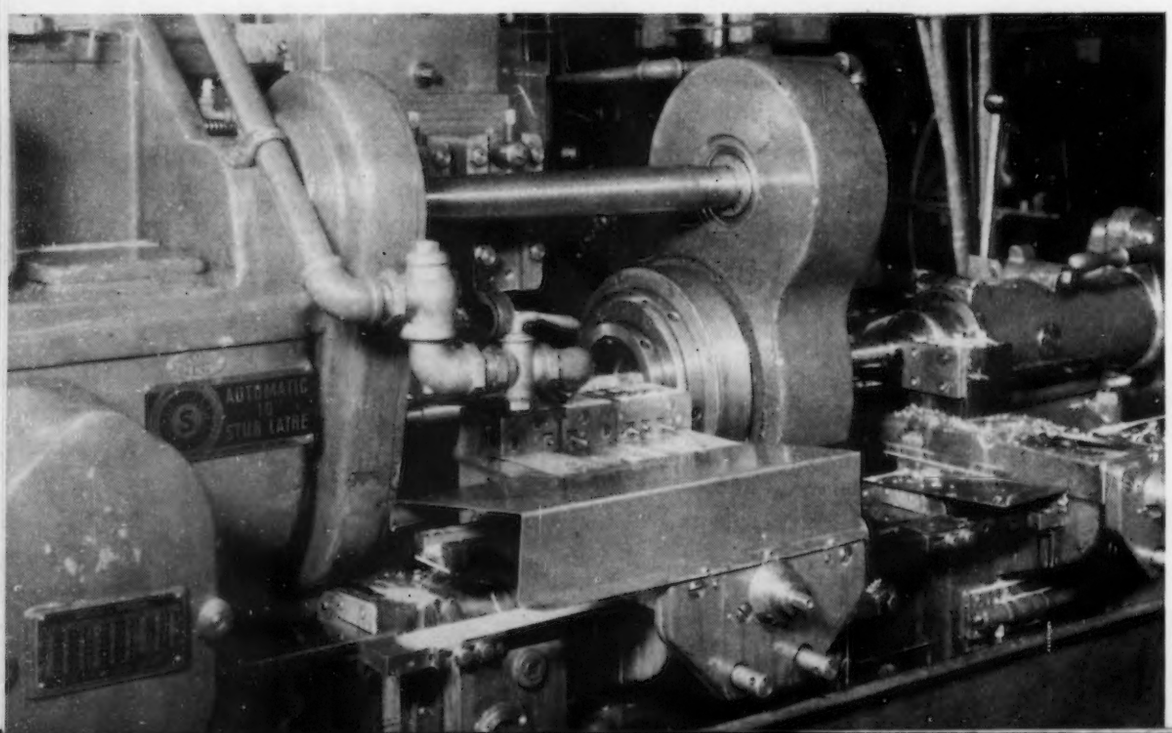
The first machining operation is to mill the ends to length. To do this, the axles are loaded in a drum-type fixture on a double-end Davis machine carrying roughing and finishing inserted-tooth milling cutters of high-speed steel. The piece is roughly located at both the taper and the splined end and is clamped in position during the work cycle by a spring tension chain that partially encompasses the drum fixture. It is merely necessary for the operator to drop a rough forging in the fixture and remove the finished one.

Directly behind him is a centering lathe for the centering operation that follows, and the same operator serves both machines. The piece is chucked at both ends and is located endwise against the stop. Although centering may be considered a rather simple operation, this particular job is a rather particular one, since it is necessary to maintain the proper depth of centers within close limits as this controls the over-all length on the turning operations that follow. A single hand lever with link connection advances both centering heads in unison and adjustable stop collars are provided to regulate the depth of drilling and countersinking. These centers are later checked with a step gage having a limit of 0.001 in.

Following the centering operation, the forging is mounted on centers and rough straightened in a 20-ton "General" flexible power press. Using a dial indicator and rotating the piece by hand, the operator corrects the shaft to within 0.010 in. on runout.

Turning Operations

Turning operations follow. These are performed in a battery of four 10-in. Sundstrand stub lathes employing center drive. A 10-in. machine was chosen since it was possible to obtain a fully automatic



o o o

PRACTICALLY all turning operations on the axle shaft are performed in a single set-up in an automatic center-drive lathe having two front carriages, two rear slides and an auxiliary overhead slide. The left-hand carriage in the foreground has three tool blocks, the middle one of which is for taper turning.

o o o

For Low-Cost Production . . .

lathe with center drive in this size. All four machines are set up on identical operations. On these machines there are two front carriages, two rear slides and one vertical overhead auxiliary slide. All slides are cam-bar operated and are provided with automatic tool relief on the return stroke. Both front carriages feed from right to left. The left-hand carriage is provided with three small cross tool slides, two for straight turning of the bearing and shoulder and one for turning the taper at the wheel end of the shaft, while the right-hand front carriage is provided with one cross slide for turning the spline end of the shaft. Limits are 0.002 in.

The right rear slide carries a chamfering tool for the spline end. The other rear slide carries four tools, two of which turn the thread diameter at the taper end of the shaft and the other two form the radius at the shoulder. On the vertical overhead slide are carried a forming tool in a dovetail holder for finishing this same thread end and a steadyrest for taking the the whip out of the shaft.

This steadyrest consists of two hardened-steel rollers carried on a U-shaped steel spring to take care of irregularities in the rough contour of the forging. A similar steadyrest is carried on the rear slide below. The spindle turns at 266 r.p.m., giving an average cutting speed of 80 surface ft. per min. Cross feeds are 0.024 in. per revolution on the front slides. One operator tends two machines and the combined output per hr. is approximately 70 shafts. On these operations ordinary soda solution is used as the coolant.

Chucking Without Leaving Cuts

One of the problems in a center drive set-up is to chuck the work without leaving any deep cuts that might serve as starting points for fatigue cracks. In these machines, the work is gripped by three round-nosed drivers advanced by cam action. The impression they leave is ⅜ in. wide and not more than 1/64 in. deep, comparable to a very light Brinell. Two movements are required to chuck the axle: one movement closes the chuck; the other locks it and gives the grips a slight hammer blow that sets the drivers so they will transmit the torque without slippage.

At first the attempt was made to carry another forming tool on the vertical slide to shape the cone-bearing shoulder at the taper end of the shaft. It was found, however, that it was not possible to maintain the accuracy required and hence this final turning operation is performed in a heavy-duty engine lathe equipped with an air chuck and forming tool on the cross slide. A tolerance of 0.003 in. is maintained between the outside of the shoulder and the other splined end of the shaft.

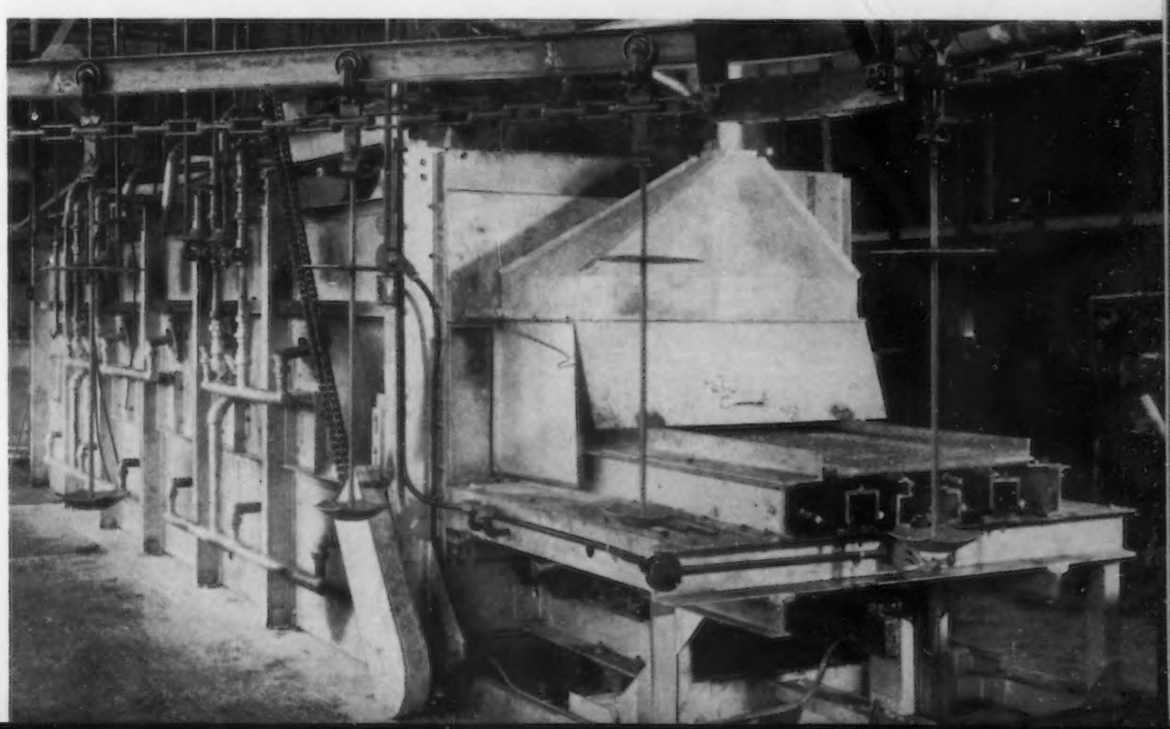
Rotary Hobbing

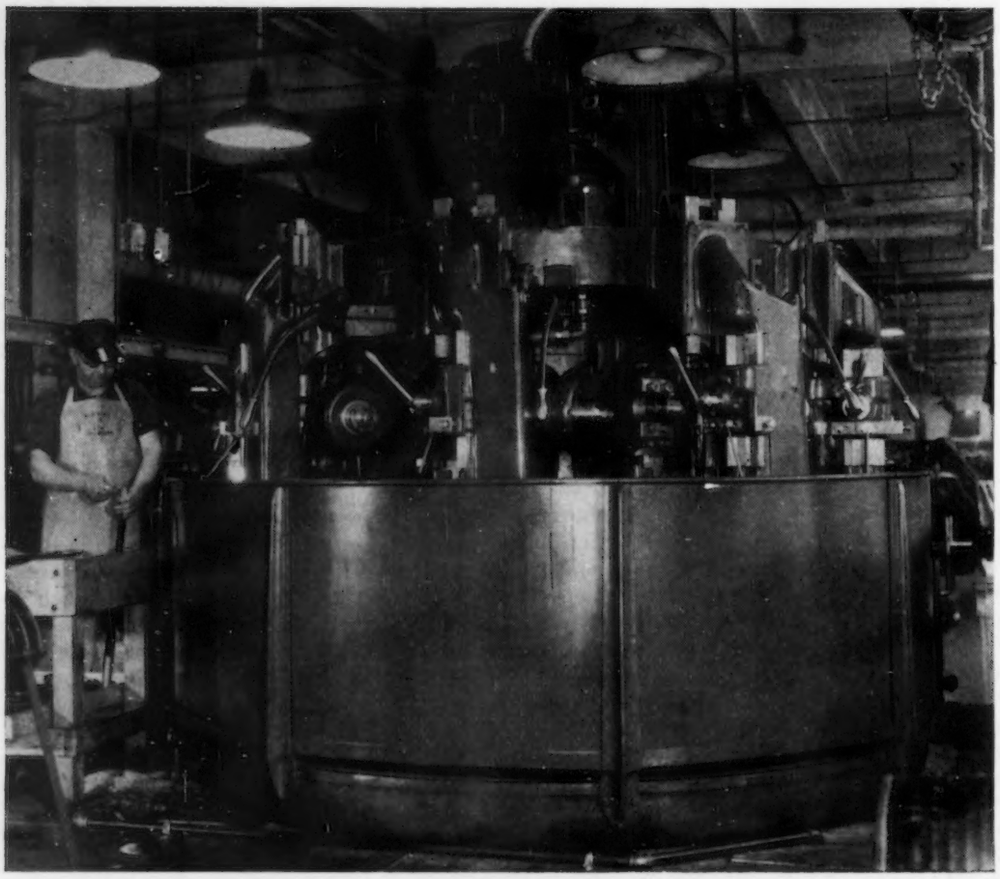
From the lathes the turned shafts go to a vertical 8-spindle Cleveland hobbing machine. This machine is of the rotary type so that the operator need only stand in one position and load and unload the work. Special drive chucks have been provided with three sharp jaws that clamp the thread blank end shank of the shaft when it is rammed into the chuck by hand. A special Chrysler formula cutting

o o o

CHARGING end of butane-fired muffle-type hardening furnace for axle shafts. Hood and asbestos curtain prevent the escape of the inert atmospheric gas within the work chamber.

o o o

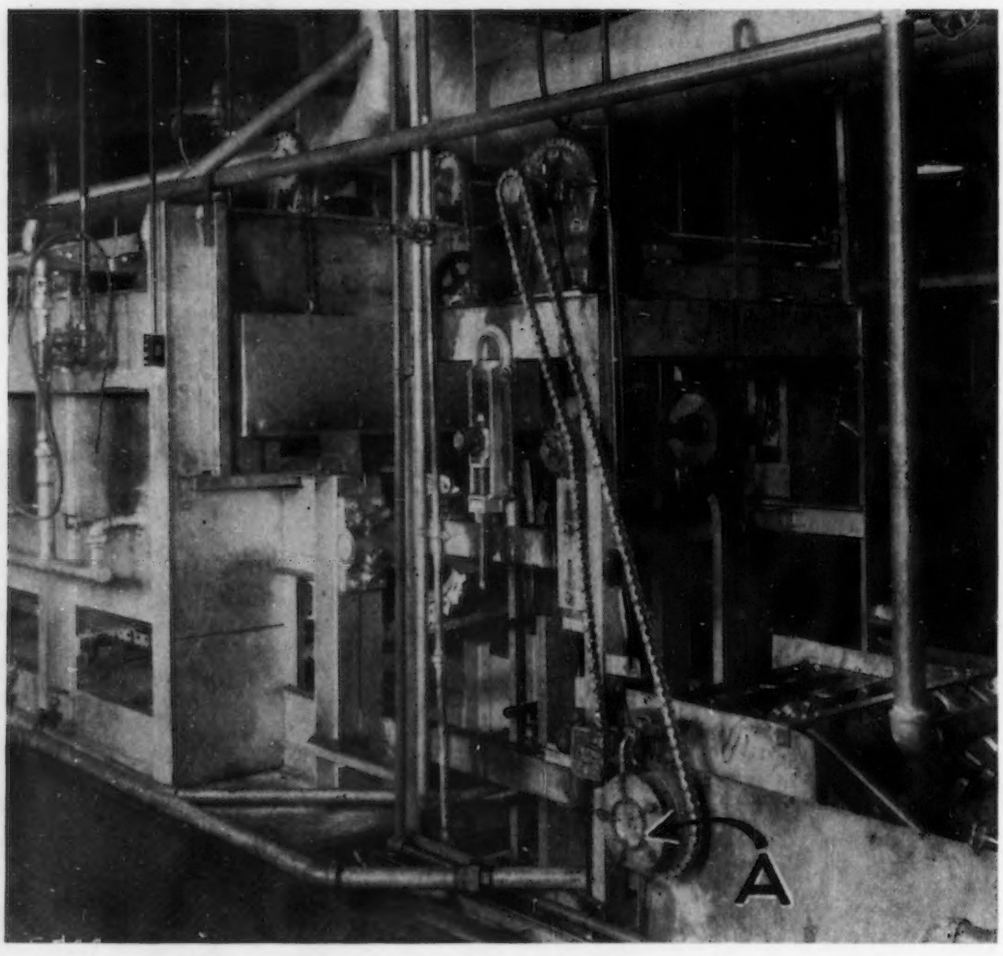




o o o

SPLINES are hobbed in this 8-spindle vertical rotary machine. The operator need only load and unload at a single station. About every 3 hr., the hobs are shifted axially one tooth width to present fresh cutting teeth to the work.

o o o



o o o

BY means of a time-delay device seen at A, the quench-tank chain conveyor stops long enough for a new shaft to fall in place. The second tank, with conveyor, is a hot water rinse to remove the quench oil before the shafts are conveyed through the draw furnace.

o o o

oil is used for the hobs, which are 3 in. in diameter and are shifted one tooth width after cutting 35 shafts each.

Twelve shifts of the hob are possible before all its sharp teeth are exhausted and in this way the hob life is about 420 shafts each between grinds. This shifting of the hob is facilitated by a screw and micrometer dial. The hob is advanced axially about 5/32 in. each time it is moved. Production on this machine is rated at 150 shafts per hr.

Following the spline cutting operation, the shafts are clamped in pairs in a double fixture in an Edlund drill press in which a 11/64 in. cotter pin hole is drilled in each shaft through the use of a double head on the spindle. The piece is then handed over to a double-head Landis bolt threading machine in which a ¾-in. 16-thread screw is turned on the end of each shaft. A single operator serves both machines. At this point the shafts are loaded in an umbrella-stand type carrier suspended from an overhead monorail conveyor that is power-driven.

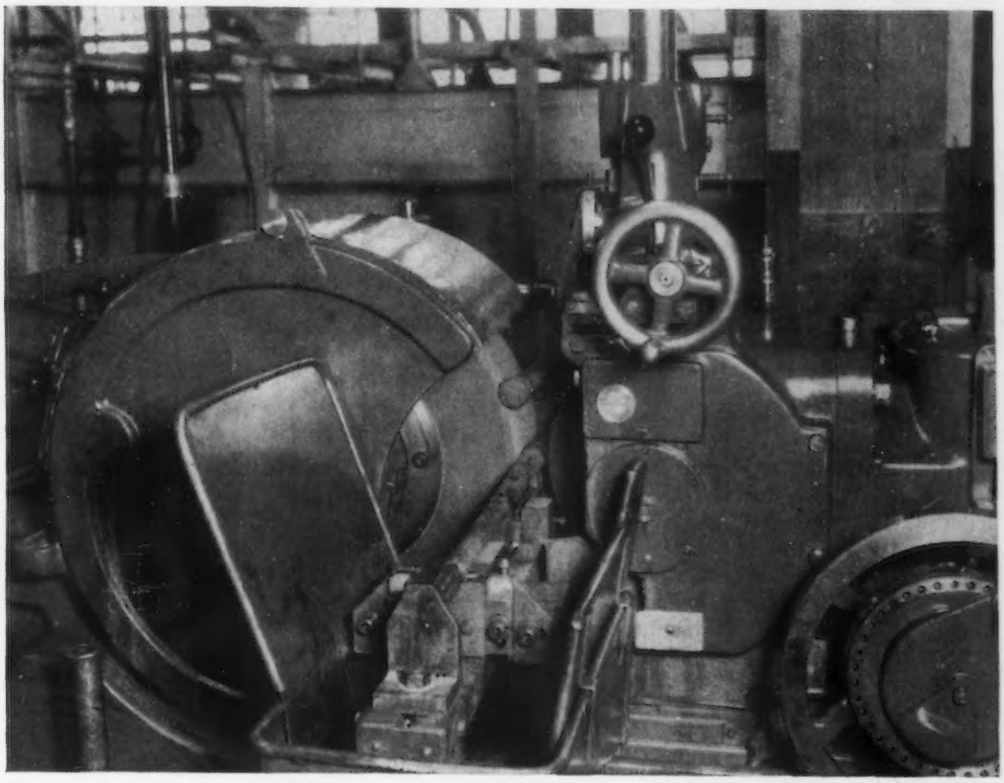
By means of this conveyor they are carried through a Detrex degreasing machine using tri-chlor-ethylene as the solvent. In this vapor-phase cleaning machine the work enters from the top at a point near the ceiling, descending at an angle so as to bring the top of the work well within the vapor area. The height of the vapor in the machine is controlled by side wall water jackets which condense any vapor that might otherwise tend to escape through the conveyor opening. In a machine of this kind, using a stabilized tri-chlor-ethylene fluid, a relatively small volume of fluid, in this example 75 gal., is vaporized and the cleansing action takes place by condensation of the vapor on the work, which then drains off taking the foreign matter with it.

Vapor temperature is 186 deg. F. Heat for vaporization is supplied by steam coils operating under 15-lb. pressure. The shafts come out dry and free from cutting oil. One of the reasons why a vapor-phase cleaner is used in this line-up is that the ordinary soda washing leaves traces of soda on the work which may adversely affect the lining of the heat-treating furnaces through the formation of a flux with the silica brick. In this installation the conveyor travels through the cleaner at the rate of 11 ft. per minute.

Furnace for Hardening and Drawing

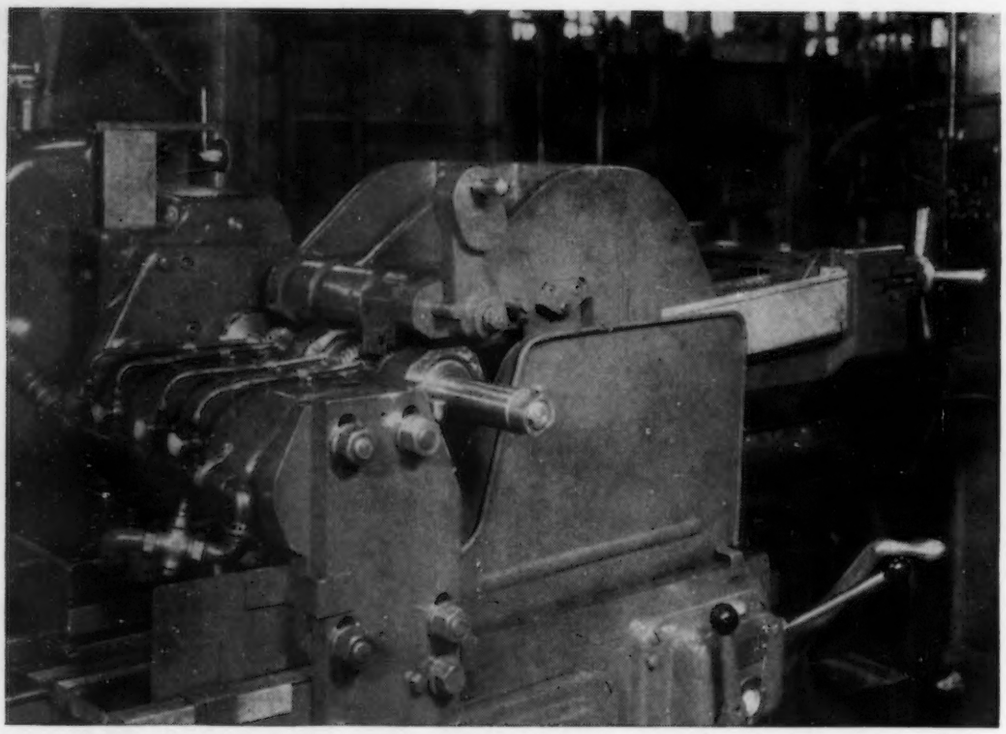
The conveyor carries the work to the loading end of a pair of continuous heat-treating furnaces in tandem, one for hardening, the other for drawing. Both furnaces are Holcroft types and are adjacent to the machine lines. They use butane gas as the heat medium, and it is supplied from a central tank and vaporizer which serve the plant. The furnaces are of the muffle type and the products of combustion do not come in contact with the work, which is maintained in an inert atmosphere. This furnace atmosphere is prepared in a Holcroft generator which cracks and partially burns coal gas obtained from the city mains so as to give a mixture of hydrocarbons, some nitrogen, CO (approximately 20 per cent) and CO_2. This partial burning takes place in the generator outside the furnaces at a temperature of about 1550 deg. F. and the mixture is then partially cooled and washed by passing through a tower containing water

o o o



CENTERLESS grinding by the infeed method. Both work and regulating wheels are diamond dressed by cam control to conform to the shape of the taper end of the axle shaft.

o o o



AT LEFT

MILLING of keyways in shafts that are only 4 points Rockwell under the cutter hardness calls for extremely sturdy spindle support and extra-rigid work-holding fixture.

o o o

AT RIGHT

DISK grinding the splined end of the axle shafts is performed while the shafts are carried in a drum-type fixture having cam-actuated work clamps. The dial gage A is used to advance the head in correcting for wheel wear.

sprays and is then refrigerated to 35 deg. to remove all water vapor.

The work is carried through the hardening furnace by a set of reciprocating saw tooth notches which lift the shafts and carry them forward a few inches before dropping them between similar stationary notches. A variable-speed drive gives flexibility to the cycle, although it is ordinarily set to deliver 138 shafts per hr., the time for any one shaft being 1 hr. and 15 min. Temperature at the instant of quenching is approximately 1435 deg. F., although the thermocouple farther back in the furnace is controlled at 1460 deg.

To provide uniform quenching the shafts are lowered into the quenching oil by means of a pair of revolving screw conveyors, and the seal between the quenching tank and the furnace is such that at no time are the shafts exposed to the air. They are thus free from scale and are not decarburized, since the furnace atmosphere is practically inert. The surface appearance of the shafts is that of a blue-black color, attained from the quench oil. Incidentally, at the charging end of the furnace, there are sheet metal hoods that practically cover the furnace entrances and in addition there are asbestos cloth curtains which further prevent the loss of the atmospheric control gases. Oil in the quench tank is recirculated and cooled in a large reservoir tank in the floor so as to maintain its temperature at about 100 deg.

Drawing Furnace Has Non-Reducing Atmosphere

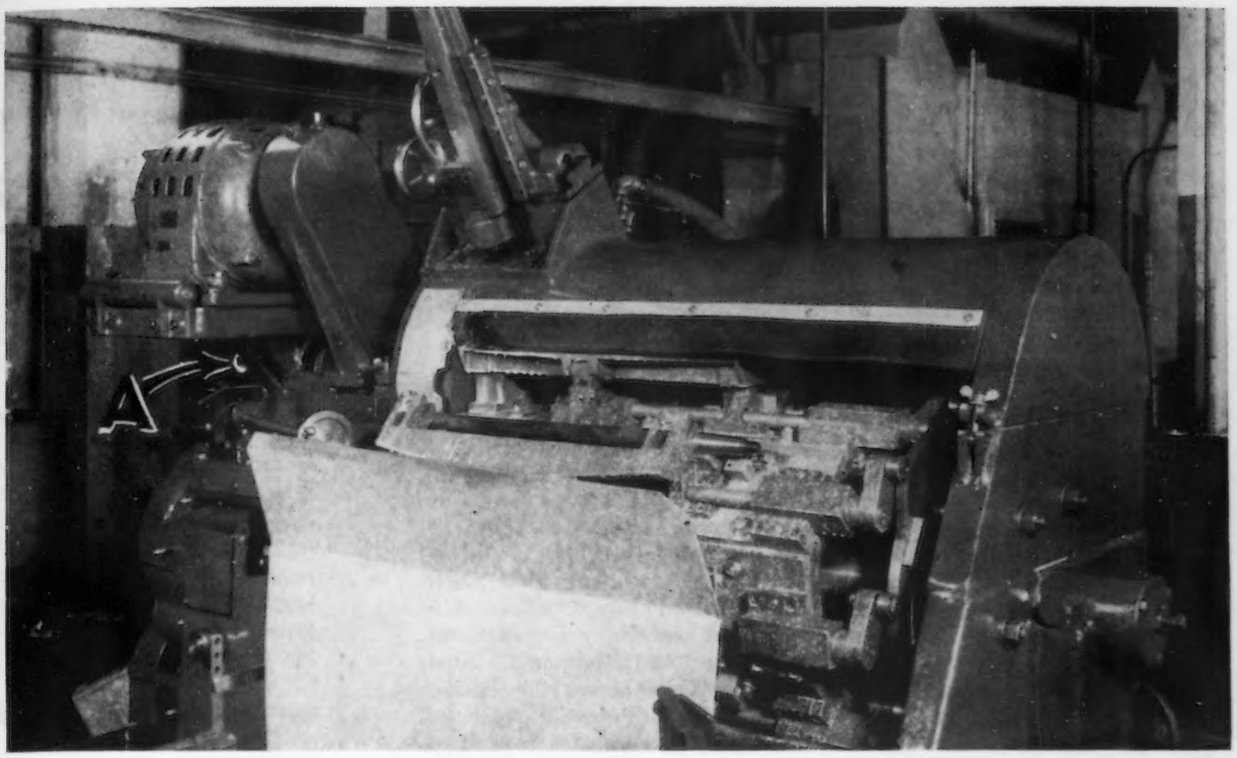
From the quench tank the axle shafts are automatically withdrawn by chain drag conveyor and dropped on another chain conveyor which pulls them through a hot water rinse, used largely as a degreaser. The pieces are then charged into the drawing furnace which is automatically held at a temperature of 800 deg. F. This drawing furnace also has a non-reducing atmosphere, but because the temperatures are below red heat, pilot burners coming in at the side at intervals of about 8 ft. are necessary to see that the atmospheric charge is ignited at all exit points. This is not necessary in the hardening furnace because of the elevated temperatures encountered.

The shafts are carried through the drawing furnace on a conventional chain-type conveyor and are dropped onto another vertically descending chain conveyor, where they are passed through cold water so as to cool them sufficiently for handling in the following straightening operation. This straightening operation is similar to the one that takes place at the beginning of the line following the centering operation, except that the tolerance on runout is held to closer limits—0.05 to 0.010 in.

Grinding Operations

At this point the shafts are again loaded on the monorail conveyor and are carried past a battery of four Cincinnati centerless grinding machines. The first two machines are set up for roughing operations, the last two for finishing and all four are on the taper end of the shaft. These grinders might be termed the in-feed type, since the wheels are dressed to shape and the regulating wheel feeds the work into the cutting wheels by handwheel.

These operations grind the taper, bearing seat and felt washer diameter, blending in on the radii on either side of the shoulder. Rough wheels are 60L and finish wheels 100K Aloxite. Allowance on the bearing seat is 7 tenths, and the taper receives a high finish free from all scratches so as to eliminate fatigue fracture. In setting up the work a stop sleeve or thimble is placed over the threaded portion of the shaft so that endwise location is from the shoulder at the thread and bottom of taper. The work rest blade of high-speed steel bears against the taper portion of the shaft, and the regulating wheel also drives this portion



and exerts endwise pressure against the stop sleeve. The spline end of the shaft revolves in a hardened steel V. Production is 80 shafts an hr. for each of the rough grinders, 110 for each of the finish.

Both work wheels (2) and regulating wheel are dressed periodically by diamond, the path of which is cam-controlled. Trimming of the work wheels is performed automatically through a hydraulic mechanism common to this type of grinder.

Cutting Keyway in Taper End

Probably the toughest operation of the whole line follows these grinding operations. This involves cutting the keyway in the taper end of the shaft and is performed on a Cincinnati plain Hydromatic miller carrying four gang cutters on the spindle. The spindle itself is supported in a special underslung overarm with two outboard bearings, the diameters of which exceed those of the cutters, which are 3½ x ¼ in., so the entire spindle and cutter assembly may be withdrawn through the arbor supports. Average life of the cutter between grinds is about 42 shafts, or a total of 168 shafts from the four work stations. This is really a record since the cutters have a Rockwell hardness number of 62, compared with a work hardness of 58. Incidentally, it is interesting to note that undercutting on the side of the teeth of these keyway cutters has been found to double the cutter life. Cycle control is automatic and it is only necessary for the operator to unload and load the work and actuate a central control lever.

The work is loaded in the top of the fixture and is held at the cutting end in taper locating blocks and by gate-type equalizing clamps exerting endwise pressure against the spline end of the shafts. Hand-operated equalizing ejectors are employed to produce the hammer blow necessary to release the shafts which are given what amounts to a press fit in the fixture by the end clamping pressure. As has been indicated, the fixture is exceptionally heavy and is of semi-bridge type construction. One reason for this, aside from the heavy load encountered, is that the cutters operate from below so as to assure a clean fixture, with little danger of chips getting into the locating details. As in the example of the hobbing operations, a special Chrysler cutting oil is employed as a coolant and lubricant.

Grinding to Length

The final machining operation on the shafts is to grind the splined end to length in a 20-in. semi-automatic Gardner grinder. This machine is of a single-disk type and features a large rotary drum-type fixture in which the work is automatically clamped by cam action after it is laid in place in the grips. End location of work is from the outside shoulder on the taper end.

To control accurately the dimension between this shoulder and the end of the shaft, to the standard micrometer wheel feed device has been added a dial indicator. By checking the output of the machine against a similar dial indicator on a gaging fixture, the exact amount that the wheel head has to be advanced to compensate periodically for wheel wear can be read on the gaging indicator and the head advance made to correspond on the other. As in the other grinding operations, soda solution is used as the coolant. Output is 375 shafts an hr.

A rethreading or chasing operation follows the grinding, largely to clean up the thread from any foreign material that may have been picked up during the heat-treating process and subsequent handling. There then remains only to wash the shafts in a hot water washing machine of Chrysler design and to inspect the shafts. There is 100 per cent inspection for length, taper, keyway size, bearing diameters, and the width and spacing of the splines.

o o o

By W. H. RASTALL

Former Chief, Industrial Machinery Division, Department of Commerce

o o o

The Unemployed

AFTER six dreadful years we still have the depression with us and some ten million unemployed. These men must be given jobs!

For decades we who sell equipment have all too often emphasized that it was "labor saving machinery." The greater the saving, the louder our boast. The Department of Labor can present plenty of examples and long has been concerned because "technological unemployment" resulted. Like a boomerang under present conditions, these proud achievements return as a challenge. The MACHINE takes our jobs! In Congress and elsewhere it is demanded that this be stopped. At the women's club, at the labor union, in the street, people resent the thought that a machine has been developed that will do the work of a score or a hundred living loving, ambitious human beings. The MACHINE is a horrible Robot or Frankenstein. It devours jobs and destroys good American homes and people like giants or ogres or dragons or vampires in a fairy tale destroy good little boys.

Yet in our saner moments, when our emotions are not agitated, we realize that most people love their little machines that make work easy—the egg beater in the kitchen, the vacuum cleaner in the parlor. the auto on the road, the spinning wheel and loom no longer in the home; ten thousand devices that in a century or so have provided us an endowment so priceless none would consider its destruction.

Is the machine a Dr. Jekyll and the MACHINE a Mr. Hyde?

In the same sane moments, we realize that it is through machinery that the American standard of living has reached the historical and geographical peak. Deprive us of our machines and we would have to live as they do in China or India or Tibet!

"We pay in the United States three times the British wage, four times the German wage, ten or twenty times the oriental wage. This has found expression in education for all, comfortable living in livable homes. . . . Machinery is the answer. . . . The industries of this country absorb $23 worth of machinery per year per capita of our entire population. How much does Britain take? About $10 worth of machinery for each inhabitant. And Germany? Nine dollars. While across the Pacific in China the figure is 5 cents. American workers earn more, live better, because the machines available to their hands produce more." (Quoted from statement of the Assistant Secretary of Commerce in 1931.)

Over the years the American Federation of Labor and the Department of Labor have not opposed the mechanization of industry, agriculture, etc. Informed labor acknowledges that in the end the workingman benefits. But they are interested in caring for the displaced man until he can reestablish himself elsewhere. This, of course, is an entirely different subject from the present challenge which applies to the relationship between technological unemployment and present day unemployment of say ten million wage earners.

And Secretary of Commerce Roper made this an official challenge before the Chamber of Commerce of the United States in the ten point program he offered April 28, 1936:

"3. Business should form and launch industrial committees to study in a comprehensive way technological unemployment."

This thinking involves a strange fallacy for the ten million unemployed are not the same men as the group that may have lost a very few jobs, comparatively, through technological progress. A few examples from the Census will illustrate:

THE subject of mechanization as a creator or destroyer of jobs has been treated in our columns from many angles. In this article, Mr. Rastall approaches it from a different direction. He shows that there is *not*

Change in Employment 1929-1933

Steel Barrels, Kegs and Drums	plus	58.9%
Shortening (other than lard)	plus	13.5%
Rayon and Allied Products	plus	13.3%
Soap	minus	1.2%
Tobacco	minus	5.2%
Malt	plus	43.7%
AVERAGE FOR ALL MANUFACTURING INDUSTRIES	minus	31.3%
Motor Vehicles	minus	56.8%
Planing Mill Products	minus	60.6%
Watch Cases	minus	65.6%
Billiard and Pool Tables	minus	70.7%
Machine Tools	minus	73.2%
Agricultural Implements	minus	76.0%
Locomotives	minus	78.4%

These examples are taken from a list of some three hundred industries but are adequate to show that technological unemployment is scarcely the explanation of what happened—and legislation discontinuing patent privileges or anything of that character would not reestablish 1929 or rational conditions. In that sense a study of technological unemployment as a cause or cure of present distress is irrelevant; its influences relatively inconsequential.

Data regarding unemployment for the years prior to 1929 are inadequate but the subject is discussed in "Recent Economic Changes in the United States" where reference is made to an estimate made by Brookmire's Economic Service that showed no unemployment whatever in the years 1926, 1923, 1920, 1917, 1912,

Versus the Machine

the definite relation between mechanization and unemployment that so many people believe exists and that the greatest degree of unemployment is found in some of the least mechanized occupations.

and 1910, and only 58,000 for 1918. Had technological unemployment been of really serious proportions, it would seem Brookmire would have emphasized rather than omitted it. Further, the Census shows there has been an increase in the percentage of our population identified as wage earners engaged in manufacture:

	Population	Wage Earners	Per Cent
1900	75,994,575	4,968,000	6.55
1910	91,972,266	6,807,000	7.41
1920	105,710,620	9,080,000	8.60
1930	122,775,046	.....	...

Although there may be many instances where machines have displaced individuals and these have suffered hardships, collectively mechanized industry has increased rather than decreased the proportion of our population it employed.

But the table showing changes in employment, especially the complete table, does suggest where this industrial employment expanded, and where the unemployment is found, and this may suggest causes and cures.

Coming and Going Commodities

Beer returned and during this period, those having to do with its production enjoyed expanding business. Those producing soap and tobacco did not experience any serious curtailment. The food and clothing industries generally felt only the change to cheaper products. Vegetable shortenings prospered at the expense of butter and lard. Something of a tragedy here. How many homes were pinched in their expenditures for butter to force an *increase* in employment here of 13.5 per cent?

But the country as a whole has suffered as never before and employment in the manufacturing industries declined on the average 31.3 per cent. The table clearly shows the most extreme declines were in the factories producing locomotives, agricultural implements, machine tools, etc., and in this area the collapse was all but complete.

Expressed otherwise, it may be stated than depression is felt least in:

1. Industries supported by style (Beer, Feathers in 1929-1931)
2. Industries that have not saturated their market (Rayon, Radio)
3. Food industries
4. Clothing industries

Those that feel depression most are:

1. Obsolete industries (Beehive coke, Miniature Golf—Those that have lost the style appeal)
2. Luxury goods (pianos, watches, bowling alleys)
3. Industries serving a depressed industry (Agriculture)
4. Construction—Residential, also engineering
5. Industrial Machinery and Railway equipment

Style, progress and obsolescence factors scarcely need be discussed here. They influence the industries they reach in good times and bad and are a special problem. Also luxuries will be in demand when prosperity arrives. (It has been said that the first industry to feel the 1929 break in Wall Street was the one that produces orchids! We hope to see the orchid days return.)

Construction Unemployment

But in construction we find an industry that ran over six billion dollars annually from 1925 to 1928 and declined over 80 per cent by 1933. Here alone is an item that will account for possibly four million unemployed not in the area of "technological unemployment." If to these be added the dentists and doctors and dress makers and barbers and others dependent upon these builders for patronage, the total is a really substantial block of unemployment not caused by the machine or hurt by the MACHINE. What was it stopped construction?

Somewhat similarly, demand for locomotives and cars collapsed. Not so many years ago the railways bought about four thousand steam locomotives per year but in 1934 they installed only one such engine. Freight train cars installed in 1923 totaled 232,000 and in 1933 only 6,410. Vast unemployment in the shops building these units necessarily followed and this was not technologic unemployment.

According to the Census, Machinery production declined from $7,103,863,704 in 1929 to $2,169,418,923 in 1933, a shrinkage of over five billion dollars, and employment in the machinery producing factories declined from 1,101,053 wage earners to 538,593, a difference of 562,460. However, this greatly understates the case, for disemployment also resulted in in every industry selling to these machinery builders. Probably this reduction of five billion dollars represented the loss of a year's employment for each of more than three million wage earners.

The depression in these machine building industries was extreme. Using monthly data and comparing the 1929 peak with the 1933 low, the declines in sales were:

Woodworking Machinery ...	97.4%
Foundry Equipment	97.0%
Machine Tools	95.7%
Industrial Pumps	87.2%
Stokers	83.4%

What caused this almost complete paralysis? Not merely technological unemployent.

Secondary Effects

It is sometimes stated that one workman employed on construction through his spending with the butcher, the baker, the candlestick maker, the doctor, the lawyer, the auto, and the beauty shops employs say three others. Obviously the volume of the disemployment of workers in the above construction

and equipment industries where the decline in volume exceeded ten billion dollars per annum together with the effect of this on the consumers goods and service industries accounts for practically all of the ten or twelve million still unemployed.

Activity in the construction and equipment industries did not collapse because of technologic unemployment and would not be revived if machinery sales were halted and our canals and highways built with fire shovels. Stopping progress will not revive these trades on which all other industry depends for its progress. These capital goods industries were so drastically depressed because of a financial difficulty—a monetary credit situation.

Residential construction was active from 1921 for more than seven years but toboganned sharply from the peak of February, 1928 when call loans commanded in excess of 5 per cent. Why invest in residences with call money at the 1929 figures which you will remember went to 20 per cent! (The reverse does not follow. Building will not revive when loan rates decline unless costs, rentals, foreclosures, distress sales, etc., are also favorable.)

Similarly industrial machinery is purchased either from the proceeds of "new capital issues" or "profits plowed back." For years these capital issues (other than refundings) have been at a very low level and continue at less than 20 per cent of what might be considered normal. Also management has not felt justified in "plowing profits back" into improved factory equipment.

Clearly "correcting" technological unemployment will not readjust the monetary-credit situation and revive these industries. The phenomena are simply not related. It is quite irrelevant to claim that present unemployment is technological; to challenge the machine because of present conditions. This distress will not be relieved as a result of committee studies of the type proposed.

We Need More Debt!

"Debt" is a strange word. Most of us have been schooled from childhood to shun debt. We simply do not believe in it. But we are great believers in "investment." Are they not the same thing? Our railways, electric and telephone companies, our enterprises generally have been financed through mortgages, stocks and bonds. Debt facilitates such progress. There is a very real relationship between debt expansion and activity in the construction and equipment industries. In the United States internal debt expanded from 38 billion dollars in 1913 to 126 billion in 1929.

These facts become truly astounding when their full significance is appreciated. It required a century and more to accumulate a debt of 38 billion and in the succeeding fifteen years we nearly quadrupled it. Also during those same fifteen years we came nearer the abundant life than at any other time. We loved that silk shirt era. This was not peculiar to the United States. Full data are not available but with war and postwar debt the world total became enormous and world business boomed. As stated above, the construction and equipment making industries were very active and there was a minimum of unemployment. When this flow of credit was interrupted in 1929 disemployment in these industries was a necessary consequence. This had serious consequences on all other industries. Depression had arrived, and reached all countries.

Bank deposits in the United States were 55 billion dollars in 1929 and only 38 billion in June, 1933 while the national income fell from say 80 billion to 40 billion with results that still appall us.

This 126 billion of debt approximates $1000 per capita or $4000 per family. We may shrink from it yet, if our economy is properly managed, it is wholesome. In cold fact probably, we can only raise the standard of living by further expansion of this debt.

Investments Versus Savings

Further, it makes a great deal of difference whether investments exceed savings. If they do, we experience effective credit inflation which is a powerful business stimulant. Contrarywise if savings exceed investments we experience a form of hoarding that is a violent depressant.

Over the century we have moved from the old colonial economy that was almost entirely agricultural with a little other than cottage industry into our present machine age where only about a third of our population are needed on the farms. The development of our resources has employed millions in constructing and equipping factories, cities, highways, thousands of capital items. Our present trouble results largely from the fact that we have, comparatively speaking, stopped building.

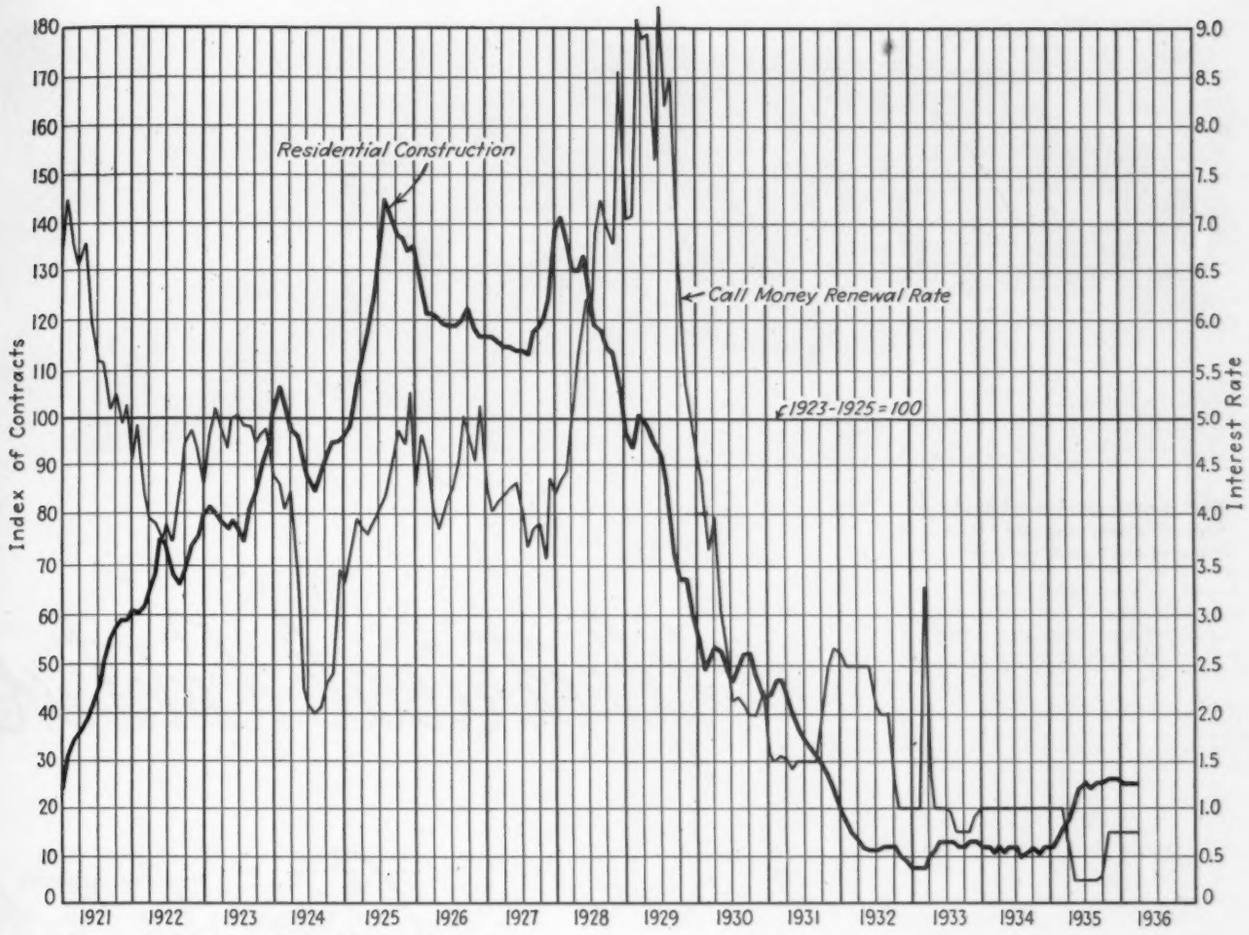
The real objective of the Secretary of Commerce and those who speak of technological unemployment is an end of unemployment. And since an investigation of this subject is officially requested, let us have it. But first we need a definition. Probably the most extreme example of "labor saving" through machinery is in the cotton spinning industry where today, in a modern factory, one spinner can produce as much yarn as could 35,000 colonial dames with the curio shop type of spinning wheel. With 27 millions spindles active, we have the equivalent of some 500 million colonial dames not engaged in spinning. Clearly this is not the technological unemployment the Secretary has in mind, yet items of this type may be considered in current discussions unless our use of words is precise, our thinking clear.

What Is Technological Unemployment

The words "technological unemployment" have been used in connection with the proposed consolidation of railways with the elimination of duplicated facilities. Is this accurate? Enumerators working on the Census of Unemployment were seldom able to narrow a case down to the technological factor. Exactly what is "technological unemployment?" And just how is it to be found?

Oppositely, any committee appointed pursuant to the Secretary's suggestion can appropriately ask that the Department of Commerce issue a statement annually covering in the internal debt and savings of the United States much as has been done for years on the Balance of International Payments. Just as this latter study has contributed greatly to an understanding of our foreign trade situation and the change from debtor to creditor status, the former would perhaps assist us to understand better the operation of the business cycle.

Mortgages, bonds, stocks, fore-



Source: F.R.B. Index - Survey of Current Business

Contracts for Residential Building 1921-36 (3 Months Moving Average) 1923-25 = 100

closures, bank loans, etc., are the products of legislation. If in the 1921-1929 period certain of these activities were overdone, it may imply there were defects in the basic laws involved. Probably in the typical case, these moves toward the abundant life were not overdone. If since 1929 curtailment of loans has been overdone, this may imply opposite defects in this legislation. And here we may have one of the most important causes of the depression, abroad as well as at home—an abrupt stoppage of credit expansion.

Our economic mechanism has been found defective. For over six years we have suffered because of the most severe depression in our history. Economists do not agree as to the causes or the measures needed to cure the difficulty. But it is quite clear that our knowledge of economics has not advanced as rapidly as our engineering and manufacturing progress. A century ago, almost all of our wage earners, not in the service industries, were employed in agriculture and the production of consumers goods. During the intervening decades we have developed machinery that enables a much smaller percentage of these wage earners to cover our requirements for these consumer items and the other wage earners have been occupied with construction, with industrial equipment and an ever larger group in the professions and service industries. The fluctuations in the business cycle arise largely from fluctuations in the construction and equipment field and these arise from monetary-credit phenomena. Engineering technicians and workers in the capital goods industries are now suffering because of an unsolved monetary-credit problem and that problem has not been solved because we need more factual information to reveal clearly what has happened and, we hope, the measures that will correct the situation. Here is an opportunity for a splendid cooperative effort. The industry committees suggested by Secretary Roper, the various trade associations, the Engineering Societies, the Department of Commerce and perhaps others, by making a careful study of the factors which cause fluctuations in the construction and equipment industries will probably discover the path to sane recovery and business stability hereafter.

Probably this will be found in the relationship of these industries to the investment-debt mechanism. Further, the nucleus of our cyclic difficulties will perhaps be found in the laws and customs in our banking and financial area governing the power to over-inflate investment during booms and to force too drastic curtailment when confidence wanes. If this be true, we need not challenge the machine, talk of the MACHINE, or stop further manufacturing progress. Instead, we discover that it is most necessary for engineers, and the construction and equipment industries to develop clearer information regarding the ways financial and credit factors control the activities of those groups.

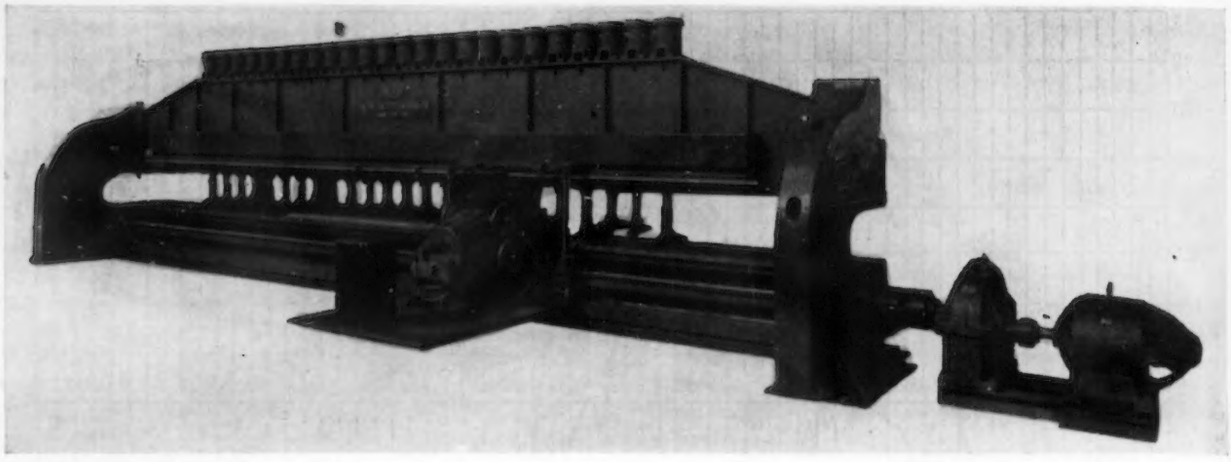


FIG. 1—General view of heavy plate planer showing drive motor and speed reducer.

Electrical Control Completed

THE increasing use of heavier deck plates on our warships, particularly on the aircraft carriers, has necessitated the building of larger and heavier plate edge planers.

In the past, plate planers have always been machines of simple design. The feed and adjustment movements of the cutting tools were made by hand as the operator traveled along with the carriage on a platform attached to it. This type of feed has been continued up to the present time, but, during recent years, reversing motor drive has been applied to the movement of the carriage along the bed, and some machines have been built with the carriage mounted on the vertical side of the bed to protect the bearing surfaces and the driving screw from falling chips.

Specifications for the larger and heavier type of machines, now in demand, have included power feed and power rapid traverse to all movements of the cutting tools. These movements are up and down in a vertical plane, and in and out in a horizontal plane which may be swiveled to angular positions between 25 deg. below and 5 deg. above the horizontal. The angular planing is required for the machining of different scarf joints.

Measuring Relay Type of Electric Feed Employed

The Niles Tool Works have recently completed a modern heavy-duty plate planer which meets the above requirements. To obtain the power feed and rapid traverse movements of the tools on a reciprocating carriage, the latest Westinghouse measuring relay type of electric feed was used.

The feed and traverse movements are driven by a 10-h.p. constant-speed motor which is ceiling mounted on the tool slide swivel as shown in Fig. 3. The tool-slide, which may be swiveled to obtain the angular positions, is pivoted on a swivel base which has a vertical movement in the main saddle to plane the edges of plates 6 in. thick. (Another machine is now being built to plane the edges of plates 8 in. thick.) The tool-slide has cross movement on the tool-slide swivel either horizontally or at whatever angle the tool-slide swivel is set. Two tool holders are positioned on the front of the tool-slide, one on each side so that planing may be performed in either direction. These tool-holders may be swiveled through an angle of 100 deg. to obtain suitable planing positions for the various operations.

Magnetic Clutches Connect Motor and Tool-Slide Screw

The feed and traverse motor is connected to the tool-slide screw, and to a shaft geared to the swivel base screw, by separate Stearns magnetic multiple disk clutches. The tool-slide screw moves the tool-slide in and out, and the swivel base screw moves the swivel base up and down. The magnetic clutches are energized by three position lever operated switches on the operator's control station which is mounted on top of the tool-slide as shown in Figs. 3 and 4. This

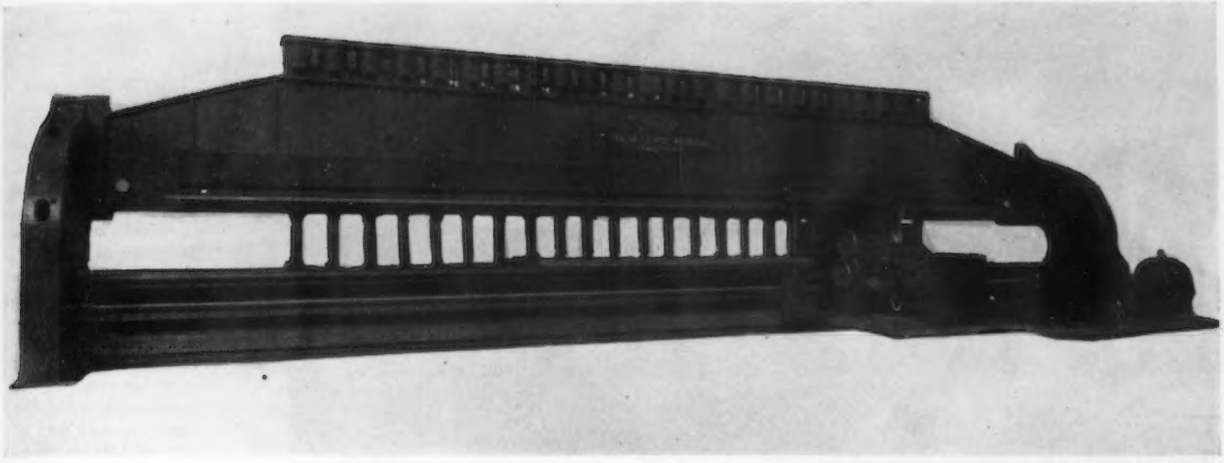


FIG. 2—Front view of plate planer. Carriage will plane plates 36 ft. long with tools cutting in both directions. Longer plates may be planed by resetting, the extended portion passing through the throat of the housing.

Features Recently Plate Planer

o o o

By M. M. McCALL

o o o

control station contains all switches and buttons necessary for the control of the machine. One of the lever operated switches is marked "Feed In"—"Off"—"Feed Out," and the other is marked "Feed Up"—"Off"—"Feed Down." The control circuits are such that these switches energize the proper magnetic clutch for horizontal or vertical feed and set up the proper circuits to cause the motor to operate in the required direction. Only one of these switches may be used at a time, that is, one switch must remain in the off position when the other is moved to an operating position. If both are moved to an operating position, the motor will not run. It is therefore impossible to feed vertically and horizontally at the same time.

Feed Operates At Either or Both Ends of Stroke

A drum type control switch is provided to select the end of the stroke at which the feed is to occur. The positions of this switch are marked "Left"—"Right"—"Both." It is possible therefore to set the feed to operate at either or both ends of the carriage movement.

The amount of the feed is selected by setting the graduated dial on the measuring relay, which may be seen in Fig. 4 just below the end of the tool-slide.

The above-mentioned switches and the measuring relay are for set-up purposes only, preparatory to the starting of the machine. The main drive motor, which drives the carriage back and forth on the bed, is reversed at each end of the carriage movement by separate stroke limit switches mounted on the upper frame of the carriage. Adjustable dogs clamped to a T-bar attached to the beam contact the stroke limit switches and cause the reversal of the main driving motor. These stroke limit switches also make the necessary connections for starting the feed cycle when the drum type control switch is set for operation at the end of the stroke at which the stroke limit switch is contacted by the dog.

Before the feed mechanism can operate, however, it is necessary to push the feed start button, which with the feed stop button is duplicated on each side of the operator's control station.

Feed Starts with Movement Of Motor

When the feed start button has been pressed, and the carriage is reversed at the end of the stroke where the feed is set to operate, the feed motor is energized. Its direction of rotation and the magnetic clutch through which it drives were selected by the lever operated switches. The feed movement of the tool starts with the movement of the motor and continues until the motor stops.

The feed motor also rotates a

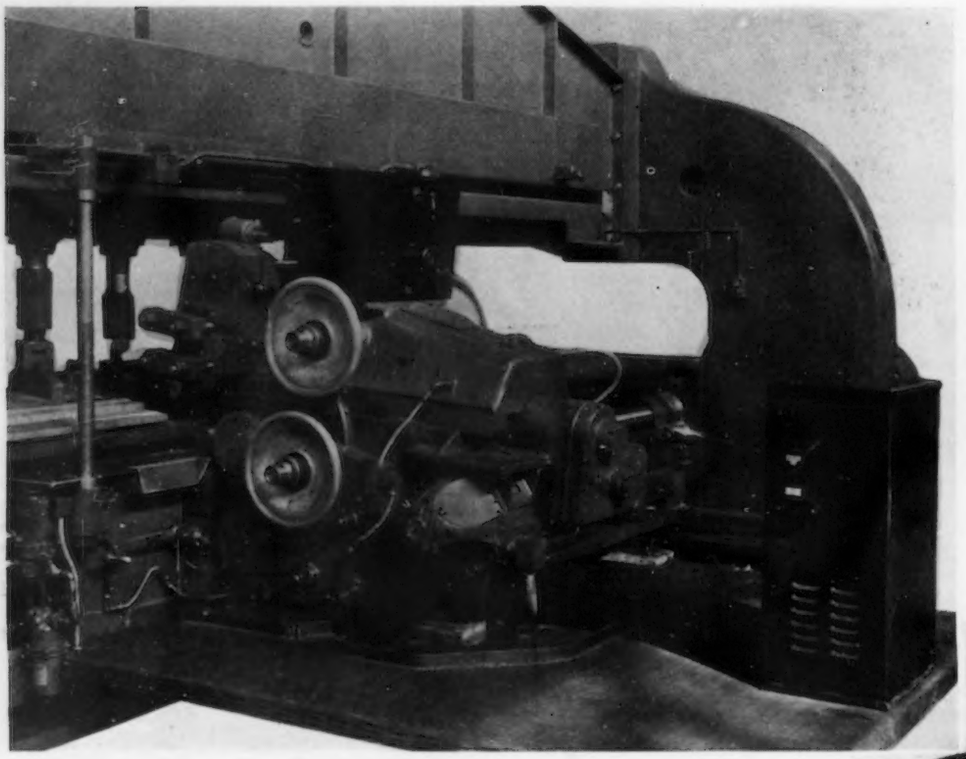
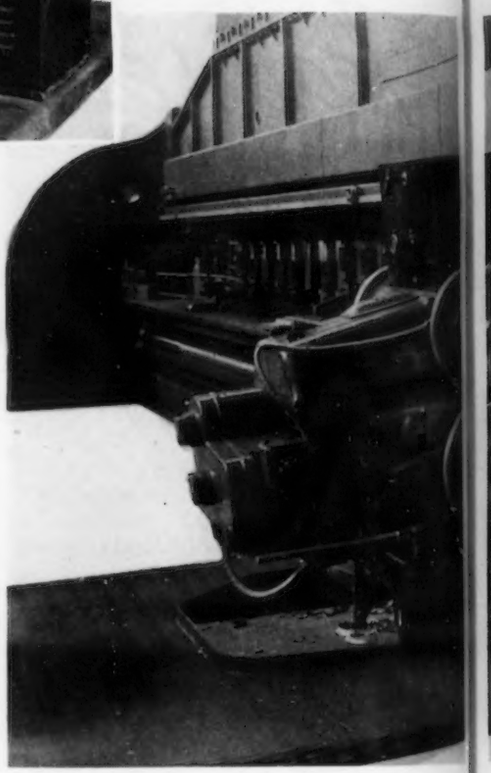


FIG. 3—Left-hand view of carriage showing electric feed and traverse motor, the operator's control station on top of the tool-slide, and the carriage controller on the outer edge of the platform, containing the relays for the operation of the main drive controller and the contactors and relays required for the electric feed. One clamping and unclamping push button for the pneumatic jacks may be seen on the housing, and one over-travel limit switch is shown near the end of the sheet iron cover over the collector rails.

o o o

FIG. 4—Right-hand view of carriage, showing the feed dial on the measuring relay just below the rear end of the tool-slide. The two-stroke limit switches (one of them partly covered by the operator's control station) may be seen on the framework over the carriage, and one of the adjustable dogs on the T-rail is visible.



heart-shaped cam in the measuring relay box through another magnetic clutch and a worm and worm wheel. As the cam rotates from its normal or neutral position in either direction, it moves an arm downward. When the arm reaches its limit of travel it strikes a lever which causes a contact to operate. Operation of the contact causes the control circuit to the motor to be opened and the motor to stop. Dynamic braking quickly stops the motor and the feed is completed.

The operation of the contact also de-energizes the magnetic clutch circuit to the measuring relay. This allows the cam and the arm to return to the neutral or starting position so that the measuring relay will be ready for the next feeding operation. The cam is biased to its neutral position by a spring and the arm is held in contact with the cam by means of another spring.

The movement of the cam must not be greater than 150 deg. in either direction. The gearing which turns the cam must, therefore, be of suitable ratio so that this amount of movement is not exceeded when the motor rotates the required amount to give the largest feed.

The angular position of the arm can be changed at its starting point by manipulation of the graduated dial on the front face of the measuring relay. By changing its angular position the arm will reach the limit of its travel sooner or later depending upon the direction the dial is rotated and produce a smaller or larger amount of feed as it is moved by the cam. The dial is graduated to indicate the different amounts of feed. The cam is shaped so that the scale spread at the small settings is greater than at the large settings. This makes it possible to set the dial more accurately for the small settings.

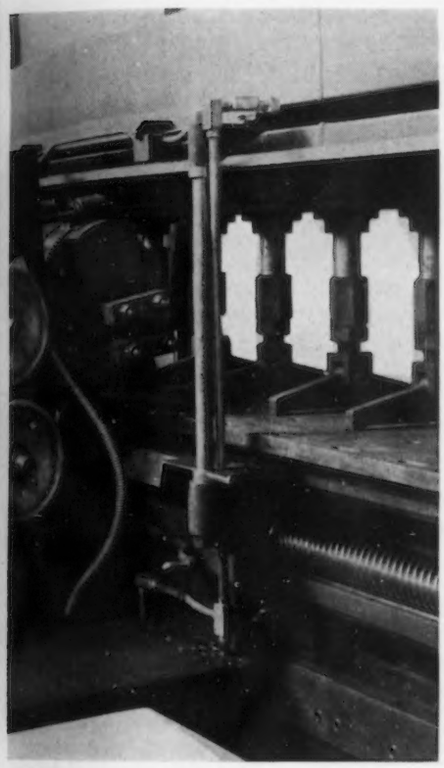
Normally, operation of the feed starts simultaneously with the movement of the carriage in the reverse direction. When planing in both directions, or at the start of the cutting stroke when planing in one direction, it is therefore necessary that the cutting tool has sufficient over-travel so that the feeding movement is completed before the tool starts to cut. To make it possible to plane to the full capacity of the machine using a coarse feed without over-travel to the tools, a tarry switch is provided. When this switch is closed, and the dog contacts the stroke limit switch, the entire feed cycle will be completed before the carriage starts in the reverse direction.

Tool Slide Rapid Traverse

Power rapid traverse to the tool-slide in and out, or to the swivel base up and down is obtained from the feed motor which is rotated continuously in the proper direc-

tion with the proper magnetic clutch energized. Four buttons, which are duplicated on each side of the operator's control station are marked as follows—"Traverse Up," "Traverse Down," "Traverse In" and "Traverse Out." To obtain the power traverse it is only necessary to push the proper button and continue to press it until the desired amount of movement is completed.

When one of the traverse buttons is depressed, the proper magnetic clutch for the required movement will be energized and the motor will be rotated to give the desired direction of traverse. When pressure is removed from the button, the motor will stop and the magnetic clutch will be de-energized.



The power traverse may be operated in any of the four directions regardless of the fed set-up. Suppose that the feed is set up for feeding the tool-slide "in" when it is desired to traverse the swivel base "up." The magnetic clutch to the tool-slide screw is energized by the feed set-up, but when the "traverse up" button is depressed, this magnetic clutch is de-energized and the magnetic clutch to the shaft which drives the swivel base screw is energized. This clutch will remain energized during the traversing operation but will be de-energized when the pressure is removed from the "traverse up" button, and the magnetic clutch to the tool-slide screw will be re-energized. From the above it is obvious that it is possible to traverse at any time without interfering with the feed set-up. However, if a traverse button is depressed the feed will be canceled, and after the traversing operation is completed, it will be necessary for the operator to press the feed start button before feeding operations as set up will be resumed.

As the magnetic clutch which rotates the cam in the measuring relay is only energized during the operation of the feed cycle, the cam is not moved during any traversing operation.

Solenoid-Operated Tool Lifters

The two tool-holders on the tool-slide are each provided with solenoid-operated tool-lifters which may be placed in operation by switches on the operator's control station. When the switch is closed, the tool-holder is lifted automatically when the carriage moves in the direction during which the tool is not cutting.

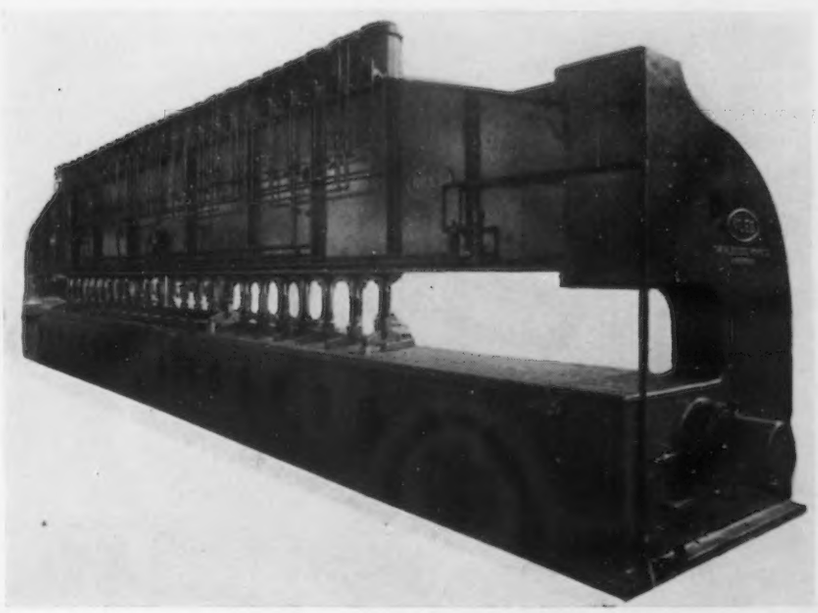
In the center of the front face of the operator's control station is located the rheostat for adjusting the speed of the main drive motor. This is a 50-h.p., 3 to 1 adjustable speed motor and it rotates the driving screw through a speed reducer. No mechanical speed changes are built into the drive, so the entire range of cutting speeds, from 15 to 45 ft. per min., is obtained from the rheostat which has 20 points of speed control.

The following additional electric control features are placed on the operator's control station. Buttons to inch the carriage to the left or right along the bed are duplicated on both sides. Safety type stop levers protrude from each side of the control station. These levers may be deflected in any direction to cause the machine to stop. Two buttons are placed on the front of the control station to start the automatic reversing cycle of the planer. One button starts the carriage to the left and the other starts it to the right.

Safety Features in Electric Control

Several safety features are provided in the electric control. The feed is interlocked with the main drive so that it will be stopped if the main drive is stopped. This prevents inadvertent operation of the feed, making it necessary for the operator to again depress the feed start button to cause feeding to commence after he has stopped the main drive motor. The main drive controller has overload and low voltage protection, and emer-

FIG. 5—Rear view of plate planer showing piping to air cylinders. The Ross solenoid-controlled operating valve is located in the center. The pipe in the foreground is only temporary, as it obstructs the throat opening of the housing.



gency dynamic braking is provided in case of voltage failure. Overtravel limit switches are placed on the beam at each end of the carriage travel. These switches will cause the emergency dynamic braking to be effective if the carriage is traveled beyond the limits set by the switches. A pressure switch is used as a safety measure in the pneumatic system. It is connected in the air line to the hold-down jacks and electrically connected to prevent the operation of the main drive motor unless the jacks have sufficient pressure to clamp the plate. An electrical interlock is provided which will prevent operation of the main drive motor unless the lubricating pump motors are running.

Plate Clamped Pneumatically

During the planing operation, the plate is clamped on the bed by pneumatic pressure in 24 double-acting air cylinders mounted on the heavy cross beam. Maximum pressure exerted is 271,000 lb. The clamping and unclamping operations are controlled electrically from push buttons mounted on the inside face of each housing. These push buttons, marked "clamp" and "unclamp," are connected to a four-way Ross solenoid-controlled operating valve. Individual cylinders may be cut out of action by hand valves near the cylinders, or they may be cut out in groups of six, valves being provided for each group. The end of each jack is fitted with a cast steel yoke case-hardened to resist abrasion by chips, except the end which contacts with the plate which remains soft. The yokes are arranged with angular adjustment to suit the width of scarfs. Adjustment is provided to prevent the yoke from turning after being set. The piping to the air cylinders may be seen in Fig. 5. The Ross solenoid-controlled operating valve is attached to the lower central part of the beam.

Large Diameter Carriage Screw

Among the interesting features of this machine is the carriage driving screw. It is 58 ft. 1¾ in. long, overall. The threaded portion is 7 in. in diameter and 39 ft. 10 in. long, with five threads of 1.2 in. pitch, 6 in. lead. The entire threaded portion of the screw is supported on the bed. The carriage nut, which is 30 in. long, is specially designed to permit the supporting of the screw. It is cast with metal completely around the hole for the threads. After the threads are cut, 100 deg. of the bottom part of the nut is planed away to a radius of 3 7/16 in. from the center of the hole, so that the screw will extend 1/16 in. below the nut and rest on its supporting surface on the bed. The threads in the nut are complete for 260 deg., but for the other 100 deg. each thread with 1/16 in. cut off of its height extends across the gap as a separate tie.

On each side of the threaded portion, the screw is turned down below the root diameter of the thread. The length of the threaded portion is such that the carriage nut will run off the threads at either end before the carriage will strike the housing. This is a positive safety feature in case the electric overtravel switches fail to function. Large diameter Rollway thrust bearings absorb the thrust at both ends of the screw.

Interesting Lubricating Arrangement

Another feature of interest is the picking up of lubricating oil by a pump on the carriage from a reservoir in the bed. The main tank for lubricating oil is cast in the bed. From there it is pumped to the radial and thrust bearings at each end of the screw and to a reservoir extending along the front of the bed. In this reservoir is located the support for the driving screw, and the oil level is maintained above this surface. A second pump on the carriage pumps oil from the reservoir as the carriage moves along the bed. This oil is pumped to the carriage bearing surfaces on the bed from where it is drained into the main tank. It is also pumped to a reservoir on top of the nut. Eighten holes from this reservoir convey oil to the top of the threads in the nut. Both pumps pump the oil through large capacity Purolators.

The nut for the swivel base screw is stationary in the saddle while the screw moves vertically with the swivel base. A reservoir of oil is maintained in the nut. As the swivel base is lowered, the screw will displace oil into an overflow basin around the top of the nut and up in a hole bored in the center of the screw. This oil will return into the nut as the swivel base is raised. Other points on the carriage are lubricated with a Farval one shot system.

The main drive motor, the screw lubricating pump motor, and the controllers for these motors are stationary. The rapid traverse and feed motor, the carriage lubricating pump motor, and the controllers for these motors are mounted on the carriage. A system of collector rails is mounted on the beam to provide means for controlling the main drive motor from the carriage, and to supply power to the motors, etc., on the carriage. The electrical equipment is arranged to reduce the number of collector rails required to a minimum. This system is inclosed for the protection of the operator.

When the machine is installed, the outer end of the operator's platform will be supported by rollers which run on a standard light section rail.

How a Large Buyer Purchases Machine Tools

o o o

By L. D. RIGDON

Director Equipment Negotiations, Westinghouse Electric & Mfg. Co.

o o o

BEFORE giving a short outline of procedure to follow in purchasing machine tools, I would like to go back approximately 25 years when the possibility of applying individual motor drives to machines was first being considered. At that time, there were very few electrical engineers in the machine tool industry. There were a few isolated cases where some individual in a machine tool organization looked after the application of motors and control but this was usually an added duty to his regular line of work.

At that time, the problem usually consisted of finding some place in or about the machine to mount the motor so that it would not protrude into the aisle, interfere with the operator, or look as if it would overbalance the machine. I have seen applications where both the motor and control were mounted on the machine but it was hard to tell whether the electrical equipment was an attachment to the machine or the machine an attachment to the electrical equipment. In those days, the electrical manufacturers were no better equipped to supply electrical equipment than the machine tool builders were to apply it to their machines. Both motors and control were large and on the smaller machines made a very unsightly appearance.

About this time, the manufacturers were becoming more interested in high production tools and in the possibility of locating them so they could have straight line production. This was one of the big factors in forcing the development of individually motor driven machine tools. A number of machine tool builders were trying to find some way to individually motor drive their equipment as they were having repeated demands for this type of equipment. Among the first machines that were installed by the Westinghouse company where the manufacturer made a real effort to build the motor into the machine, or at least make it an integral part of the machine, were a planer having reversing motor drive, a hand miller with the motor mounted inside the base, and a vertical-spindle grinder where the spindle of the machine was the shaft of the motor.

THIS article is from an address by Mr. Rigdon at the Machine Tool Electrification Forum, held at East Pittsburgh, June 22-25. As reported in THE IRON AGE of July 2, this forum was attended by 50 or more representatives of machine tool builders and comprised comprehensive discussion of motor, control apparatus and miscellaneous equipment. The session at which Mr. Rigdon spoke was devoted to "Viewpoints of Buyers and Users of Machine Tools."

Reasons for Buying Equipment

We purchase equipment for one of the four following reasons:

1. To replace obsolete or worn-out equipment.

2. To extend manufacturing fa-

cilities, increasing production on a going line of apparatus.

3. To start manufacture on a new line of apparatus.

4. To lower unit costs on an existing line of apparatus.

Our company is divided into units and at the end of each year, each unit makes a survey to determine what equipment should be replaced and what additional equipment will be required for their activity during the following year. From this survey, the yearly appropriation is compiled and when this has been approved by our management we are in a position to start negotiating for the equipment.

The tool supervisor of each unit makes a detailed study of his requirements and submits a "Request For Equipment" outlining the equipment required and expected savings that can be made by its installation. Quotations are then secured from the manufacturers of this type of equipment and their representatives are asked to call to discuss the application of their machines to our particular job. After a study of the various quotations a machine is selected which in our opinion most nearly fits our needs.

Considerations Affecting Choice of New Tool

There are a number of points we consider when making this selection, namely:

1. Do we know from past experience that while the machine looks good on paper, repair bills are high and down-time due to repairs is excessive with corresponding loss in production?

2. Does the company give service, that is, when difficulties arise in the operation of its machine, does it have its representative call to make the necessary corrections in the shortest possible time?

3. Does the machine embody the latest improvements in design for that particular type of equipment?

4. Is the machine properly guarded so that a workman can operate it safely?

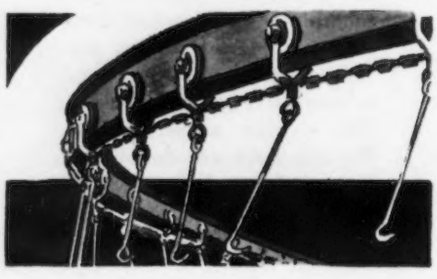
5. Is it advisable to purchase a duplicate of a machine we now have in use that goes into a line of similar machines in order to have interchangeable tool equipment and to enable us to switch operators from one machine to another without any loss in production?

6. Very often we sent out drawings showing the piece to be machined and have the manufacturers submit quotations on the equipment they recommend together with production estimates. In cases of this kind, we select the machine that gives the maximum production for the least amount of money expended.

7. The question of delivery very often enters into our choice of a machine in that when it is found necessary to have a product on the market at a certain time, we must have the machine for manufacturing this product on a definite date. Assuming that two or more competitive makes of machines are equally satisfactory for a given job, the one with the shortest delivery will receive the order.

8. The type of drive is also a factor in that we try to select machines to which motors have been applied so as to give the most economical operation. With the new cutting materials that have been developed in the last several years, speeds and feeds have been increased and the type of drive will very often affect the range of these speeds and feeds, for example:—a machine driven by an adjustable-speed d.c. motor or a multiple-speed a.c. motor.

9. Is one machine easier to set up than another? This is important when dealing with machines that are used for short-order work where pieces come through in small lots.



10. Are we justified in the purchase of a high priced special high-production machine over a standard machine at a lower cost with a smaller production capacity? In such cases, a decision must be reached on the following points:

(a) Do we have sufficient production to keep the machine busy?

(b) Will the cost per piece be low enough to justify the additional cost of the special machine?

(c) Will the piece be in production a sufficient number of years to pay for the machine, as it will undoubtedly be obsolete and have to be scrapped if the piece is no longer manufactured?

(d) In case the design of the piece is changed, can the machine be changed over to manufacture a new design without involving a large expenditure?

(e) Is the company offering the machine reliable, that is, is it likely to be in business for a number of years so that equipment purchased from it can be duplicated and repair parts secured when necessary? This does not mean that the company has to be unusually large with respect to size, etc., but it must be well established, have good finacial rating and have a personnel with the ability to keep the equipment up to date.

"Open Shop" Buying Policy

We try to maintain an open shop for the representatives of machine tool builders, allowing them to visit the different departments of the company in conjunction with one of our own men, to study our present methods of machining and make suggestions as to what they can do to reduce our manufacturing costs. If the representative sees work being done on which he believes he can improve with his equipment, he is given drawings and is asked to submit quotations together with production estimates. These production estimates are turned over to the tool supervisor or cost analysis department to determine what savings can be made over our present method.

I find that quotations generally give a complete mechanical description of the machine but the description of the electrical equipment usually consists of one or two lines such as: main drive: 5 hp., 1800 r.p.m.; feed, 2 hp., 1200 r.p.m. It is a rare case indeed when a quotation gives the type of control that should be furnished and how these motors should be tied in with each other.

You will find on looking at the average illustration in a machine tool catalog that the machine is usually shown with the motor mounted but that there is no indication as to where the control, push buttons, etc., are mounted or should be mounted.

Quite frequently, we ship to the machine tool builder complete electrical equipment for mounting on the machine. When these machines are shipped to us, we find in many instances that the wiring will not pass our inspection, the push button is mounted in an inaccessible position or the control is mounted so that it interferes with the operation of the machine or handling work to and from the machine, with the result that it is necessary for us in quite a few cases to relocate the control and push button and rewire the job.

I would like to give you an example of what should be avoided. Recently, we sent out an inquiry calling for a machine complete with Westinghouse electrical equipment. The quotation received specified that machine was complete with Westinghouse electrical equipment. When this machine was received, it actually had the following equipment: a Westinghouse motor, a General Electric push button, an E. C. & M. control and a Square D switch.

We are at a loss to understand why any manufacturer would ship a machine to us, of all people, equipped in this way; in fact, we cannot understand why he would ship a machine to anyone with four different makes of electrical equipment. A standard form of wiring should be agreed upon and some standard should be set up for the location of push buttons, control, etc. Electrical engineers in the machine tool industry should influence the design of the machines manufactured so that not only the motor but the control and push button will be built into the machine.

Shop and Equipment Obsolescence Hinders Successful Railroading

IN a final report which makes no recommendations for specific action by railroads, Joseph B. Eastman, until recently Federal Coordinator of Transportation, submitted constructive data to those who are interested in or concerned with railroad operation and maintenance. Maintenance-of-equipment expense averages more, Mr. Eastman pointed out, than 27 per cent of all operating expenses, the total of which is over $1,000,000,000 a year.

In tabulation of expenses over a 17½-year period, amounting to $10,420,917,542, it was shown that only $128,610,009, or 1.23 per cent, was devoted to shop machinery, and $282,670,876, or 2.71 per cent, was devoted to shop and engine house improvements. This made a total of only $411,280,885, or 3.94 per cent, for improving facilities used for performing work which has cost on the average over $1,000,000,000 per annum for the past 10 years. It was pointed out that in a fair survey of representative locomotive shops utilizing the facts of known machine ages only, the average machine tool age is 21.8 years.

Three fundamental functions held to be responsible for 90 per cent of all railway operating expenses; maintenance of way, maintenance of equipment, and conducting transportation. Total charges to maintenance of equipment accounts amount to about $727,000,000 per year of which approximately $436,000,000 is for labor. On an average of once in each 4.29 years, an amount equal to the original cost of all locomotives is spent for their repairs. During average locomotive life, an amount equal to 4.82 times original cost has been spent for locomotive repairs. The total amount of deferred maintenance indicated in locomotive and freight car accounts is approximately $175,000,000 for locomotives and $246,000,000 for freight cars.

The report suggested that if the average age of machine tools were to be maintained at 7½ or 8 years, rather than 21.8 years as at present, an annual saving of $20,000,000 might be salvaged from machine repairs; this amount representing 87 per cent of an amount required to replace all existing shop machinery in a period of 14 years.

It is significant to note, said the report, that several of the most successful railroads, measured by low operating costs and regular dividend payments to stockholders, are those which have consolidated their repair operations into the least possible number of shops, and have provided modern machine tools and facilities for maintenance.

It was noted that numbers of shops, built in the period of 1865 to 1900, are still in use. While many of these may have been enlarged and equipment added to, they represent hopelessness of modernization to make them efficient in problems of repairs on locomotives and cars of today.

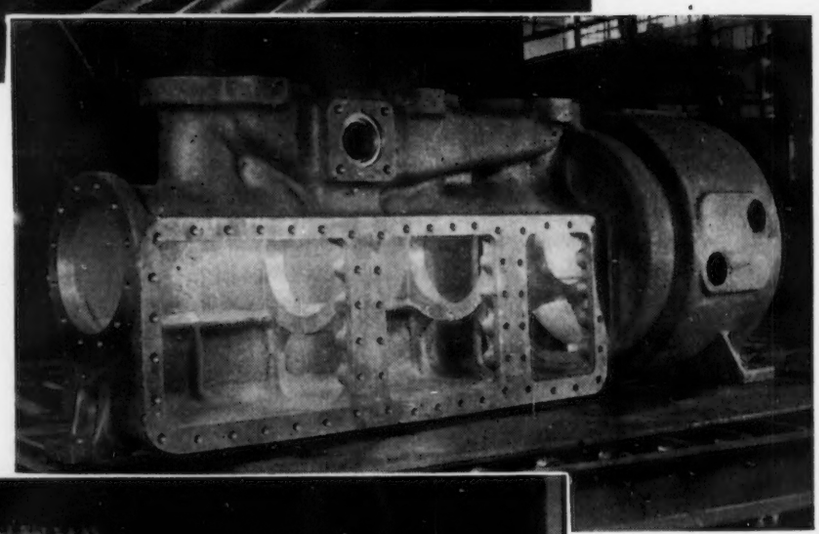
The report gave much thought to joint use of major repair shops and modernization of repair facilities. In this connection it commented that consolidation or joint use, without the installation of new machinery, would fail of a greater part of the possible savings. The single item of savings obtainable from modern machinery alone was estimated at 20 per cent of the total with increased percentage through joint effectiveness in combination with other modernizations and corrected policies of maintenance schedules.

The statistical data analyzed in the report was collected from authentic sources and presented practically every phase of this railroad problem which is vital because of the extent of its employments, the necessity for railroad service, and the immediate relationship of such service to the individual, the group and the Nation.

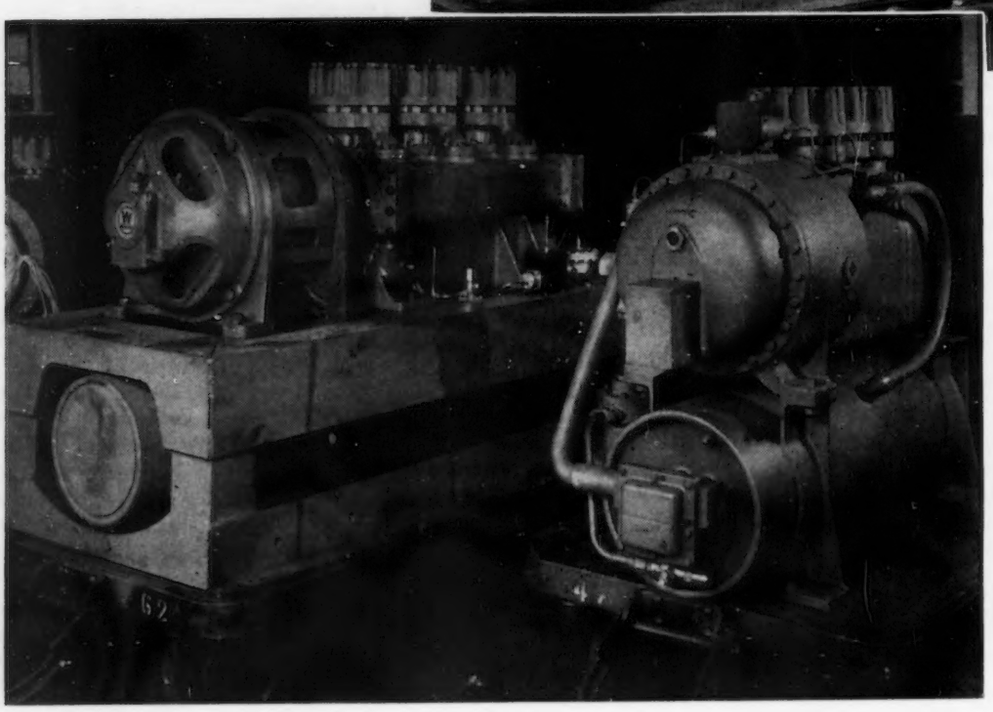
There are two major repair shop classifications which total 94 per cent of expenditures for repairs; locomotives, 52.4, freight cars, 41.6 per cent. The percentages are based upon expenditures and do not include deferred or under-maintenance, referred to elsewhere in a three-year total, now existing, in the amount of $421,961,761. This deferred maintenance is equal to 45.8 per cent of cash dividends paid by all railroads in 1930-32, but is specified as not related to the fact of dividends.

Man

• • •



A DIFFICULT casting. The crankcase, of nickel iron, is cast integral with cylinder block and motor housing. The entire operating mechanism can be exposed for adjustment by removing the side plates. The view (above) shows the tightening of end-bolts after the crankshaft and piston have been assembled. A large number of bolts, of chrome-nickel steel, are employed.



AT LEFT

NEW Westinghouse hermetically-sealed air conditioning condensing units, the type CLS, for the manufacture of which a new production layout has been installed at the East Springfield works. Direct drive, with motor and compressor on the crankshaft; unusual compactness and light weight; water cooling of the motor; interchangeable parts; and a series-parallel condenser manifold permitting use city water or cooling tower are features.

ufacture of New Sealless Air Conditioning Unit

INCREASED facilities for the manufacture of medium size compressors of new design have been provided at the East Springfied, Mass., works of the Westinghouse Electric & Mfg. Co. About $500,000 is being spent in equipping and developing the new manufacturing unit, which is located in a one-story saw-tooth type building having about 40,000 sq. ft. of floor space. Equipment is of modern design and the plant is laid out to most economically produce the hermetically-sealed compressors and self-contained room cooling units developed by the company.

Castings and raw material enter the factory at one end and progress through the various finishing operations. The center aisle is used to make the parts, which when finished are assembled with the finished castings and housings in an air conditioned, dust-proof assembly room. After being tested, the equipment is boxed and warehoused ready for shipment.

Production problems introduced by the new machine are reflected from the following brief description of the compressor. While different from compressors previously marketed, these machines employ no new principles. They are completely inclosed; this eliminates the seal or stuffing box usually required to prevent leakage of refrigerant at the point where the driving shaft enters the crankcase. Complete inclosure of the compressor makes possible a direct drive with the motor rotor overhung from the compressor main bearings and mounted directly on the crankshaft. Direct mounting of the driving motor does away with the necessity of the usual bedplate for lining up the compressor and motor and also the usual driving belts, pulleys and their accessories. Thus the units are considerably more compact and are lighter than previous machines of equal capacity.

EDITORS of a number of technical, trade and business publications were guests of the Westinghouse Electric & Mfg. Co., June 17, at a preview of the company's new hermetically-sealed air conditioning condensing units with nominal ratings from 7 to 22 tons cooling capacity.

This preview, held at the East Springfield, Mass., works was followed by inspection of the recently installed manufacturing facilities outlined in the accompanying article. Speakers at the preview included L. E. Osborne, manager, Westinghouse East Springfield works; S. F. Myers, manager, air conditioning sales, Mansfield, Ohio; E. R. Wolfert, division manager, air conditioning engineering, East Springfield, and R. A. Kroeschell, vice-president, Kroeschell Engineering Co., Chicago.

There are several methods by which the motor can be cooled. Since, however, water is usually used to condense the refrigerant, the same water can first be used to cool the motor. Therefore this method of cooling the motor was adopted. The water jacket for cooling the motor is cast integral with the crankcase. The fact that the motor is water cooled allows extreme flexibility in locating the apparatus since no provision for ventilating the motor and bringing in cooling air need be made. To reduce external piping to a minimum, the intake and exhaust manifolds are also cast integral with the crankcase. The casting integrally of cylinders, crankcase, motor housing, cooling jacket and intake, and exhaust manifolds requires a rather intricate casting, and then, the fact that the cylinder bores must be free from blow holes, etc., as well as that the entire casting must be gas tight, naturally adds to the difficulty in successfully producing the crankcase.

As the air conditioning business, or perhaps that part of it requiring the use of compressors for cooling, is still in its infancy, the number of any one size compressor to be built annually is at present relatively small. To secure low tooling costs, reasonable engineering expense and the advantage of high production and still produce a number of machines of different capacities, the line of compressors was designed to use as many common parts as possible, such as pis-

AT LEFT

SURFACES of cylinder heads are finished to the smoothness necessary to maintain leak-proof surfaces.

o o o

BELOW

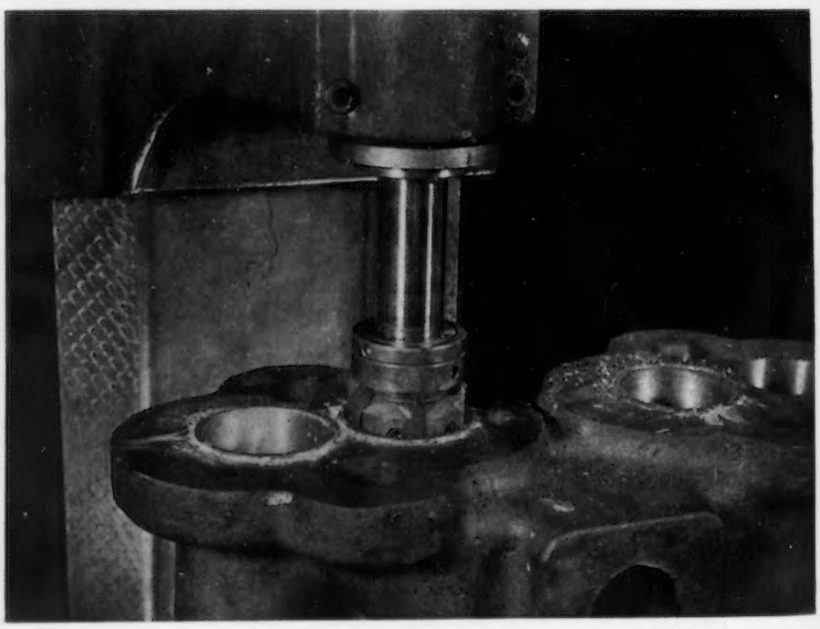
CYLINDER bores are machined on a group of three vertical-spindle machines using a V-track fixture. First they are rough bored, then finish bored, and finally, honed.

tons, rods, bearings, valves, head, etc., by using multi-cylinder compressors. Thus a 7½-hp. unit consists of two cylinders, the 15-hp. has four cylinders, and a six-cylinder is used for the 25-hp. size. Use of so many common parts is also intended to facilitate servicing, as few service parts need be carried in stock for the complete line of machines.

Mounting Holes Locate Machining Operations

The general tooling scheme consists of using the compressor feet and mounting holes as the locating point for all machining operations. The compressor is designed with a three-point suspension to avoid the use of shims and need for accurate machining of the supports. The feet are first planned with reference to the unmachined crankshaft bearing supports and motor housing. Then the holes in the feet, which are afterward used as mounting holes, are accurately drilled by means of a jig, the jig locating the holes from the rough cylinder bore and the bearing supports. After the planning and feet-drilling operations, all other jigs and fixtures for further machining the crankcase locate from these holes in the feet.

The cylinder bores are next finished, first using a roughing-out boring tool, then a finish boring tool, and finally a hone. This

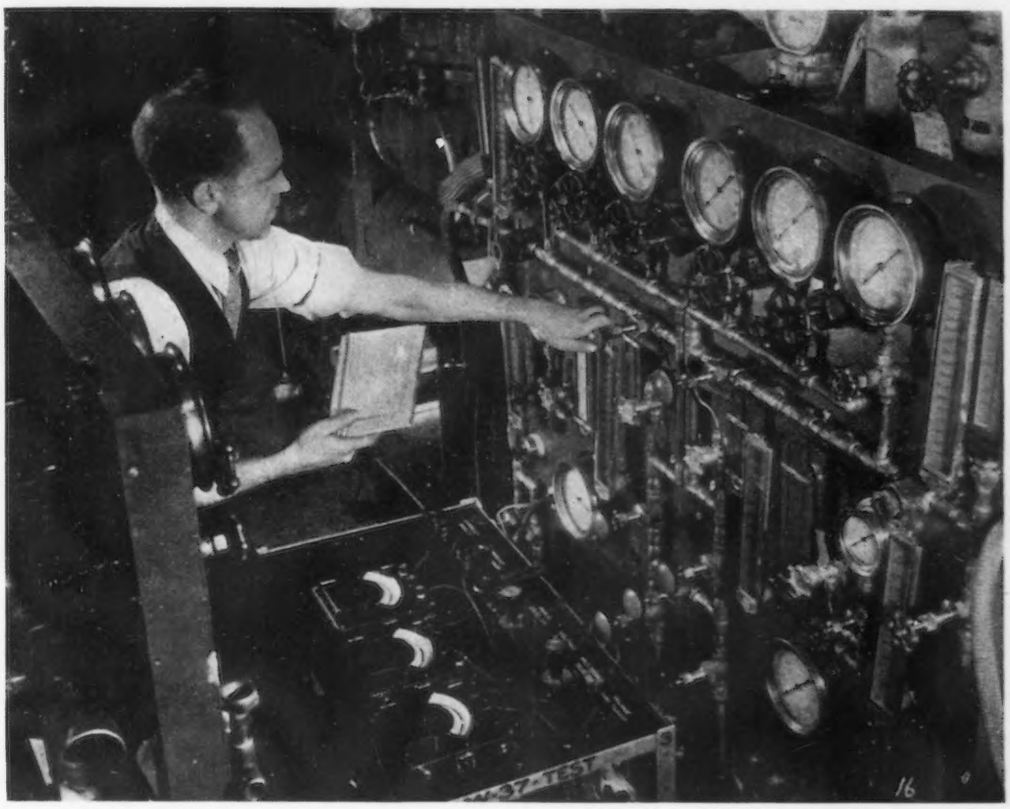


is accomplished by means of a V-track fixture and three vertical spindle machines. A stop at the lower left-hand corner of the fixture fixes the distance between cylinders with sufficient accuracy to match up with the crankshaft throws. The crankcase is then bored for the main bearings; the same operation faces off both ends and bores the motor housing for the motor stator. This boring operation is performed on a horizontal boring mill equipped with a 4-in. boring bar supported by an outboard bearing. Again the fixture used locates from the holes in the feet. Drilling and tapping for the side covers, bearings and heads are done on a radial drill equipped with a trunnion fixture. After being machined, the casting is thoroughly cleaned, and then brought into the air conditioned dust-proof room where the necessary parts are assembled into it.

o o o

CAPACITY, water and current consumption, valve action, oil flow and other tests of the condensing units are made at this electrically-operated and controlled test board, prior to painting and packing for shipment.

o o o



Crankcase Cast Vertical

As the complete compressor depends almost entirely on the crankcase casting, considerable attention has been given to the casting operation. The crankcase is cast inverted from its normal position to obtain the best possible metal for the cylinder bores. A generous number of risers are used to assure good, solid metal. The extra heavy wall thicknesses and ribbing result in a crankcase strength many times that normally required. Notwithstanding the heavy casting, the design has resulted in a reduction in total weight from 3400 lb. in a previous 25-hp. design to 2000 lb. for the new design, with an increase some 16 per cent in refrigeration output. In addition, the casting-in of many parts formerly separate has cut down the machining necessary and also materially reduced the gasketed surface area.

Air-Conditioned Assembly Room

The crankcase casting and parts are thoroughly cleaned by automatic equipment and then assembled in an air-conditioned, dust-free room. This room is kept under a slight pressure by introducing filtered outside air, the pressure causing air to leak from the room rather than into it. This precaution is intended to keep the compressor as free from dirt as possible, and thus assure service-free operation.

Each compressor is run-in to smooth up bearings and cylinder walls by driving it in a bath of oil, the oil being continuously circulated and filtered. The total running-in process takes about 9 hr.

The compressor complete with condenser is tested for leaks, and each unit is completely tested with its control for performance. The rating of the larger machines is obtained by loading the unit by means of a steam calorimeter. Dry superheated steam is admitted to the calorimeter and the condensate measured. From the data noted the rating is easily obtained. The smaller units are loaded by means of an electric calorimeter. Before leaving the test floor the units are filled with sufficient refrigerant to give a gas pressure slightly greater than atmospheric, using the refrigerant for which the unit was designed. It is then painted, boxed and ready for shipment.

Trends and Methods in Foundry and Machine Shop Accounting

o o o

By GEORGE V. LANG
Secretary-Treasurer, United Engineering & Foundry Co., Pittsburgh

o o o

THIS subject would be much simpler were it merely "Trends in Costs," because everyone knows that costs have been going one way on an up-hill street ever since March 4, 1933. The main reason for increasing costs is the increasing fixed charges. The Revenue Department fixes depreciation; NRA fixed the working hours and wages; Congress fixes the taxes; and if there should happen to be any profit, the President says: "I'll fix that, with a surplus tax."

Heavy foundries and machine shops are the main elements in the production of rolling mill machinery, but these are necessarily and primarily supported by many other departments before their production begins, such as the development and research work done by specialists in the engineering department and laboratories. Then there are the pattern shops, forge shops, and all the other service departments required for their operation. This paper, however, deals only with the foundry and machine shop.

This heavy type of shop is usually adapted only to the jobbing trade and not equipped nor manned for mass production. There are few pieces of product of exactly the same kind, and every part or piece is manufactured for a specific order, ordinarily designed for an individual customer's particular need. Many contracts require from 6 to 12 months to complete. This condition immediately presents the importance of a job cost. Job cost systems have been used in the industry for at least 30 years, but many varying methods have been used in their preparation. Since these job costs are the recorded experience of previous activities, they are used to a great extent by the estimating, engineering, and sales departments in estimating the cost of new work. It is important, therefore, that the job cost be compiled on the basis of normal shop operations.

With the exception of direct materials on a job, all productive operations are calculated at what we term "normal operating rates." These rates are not frequently changed, but only when the regular control checks with actual production cost and future prospects indicate a serious variation either way. The purpose in not making frequent changes is to provide, first, a check with the original estimate, since the same cost rates are used for the original estimate as well as the ultimate job cost; and second; a check with previous job costs. The estimating department is always made aware of any serious variations between original estimate and job costs, and it is its duty to adjust future estimates to provide for unusual conditions causing such variations.

In addition to direct material, or material purchased in a finished or semi-finished condition, the job cost is charged with the productive time of the engineering department, pattern shop, and forge shop at normal rates, and finally casting costs and machine shop hours.

Cost of steel castings manufactured in the foundries of our industry is generally calculated at normal rates for material and for each direct labor operation. These rates are calculated on the basis of a reasonably long production experience, not the best in our experience and, of course, not the lowest. Machine rates in machine shops are likewise based on our own established normal. There are many ideas of normal production throughout the industry, and even among the various associations representing the industry. The subject

*Abstract of an address delivered before Pittsburgh Chapter, National Association of Cost Accountants, May 20, 1936.

of normal production and "what it is" always turns out to be a good subject for discussion as continuously changing conditions make us wonder, sometimes, whether we are right in our own conclusions.

Influence of Steel Founders' Committee

The trend or tendency in the methods used for costing of steel castings has been considerably influenced by the work of a standing committee on uniform cost and the publicity on the subject by the Steel Founders Society of America. Their formula, while adapting itself with variations, to the light or heavy foundry, provides for not only the preparation of monthly production costs, but for the costing of each casting produced at normal rates. All of the departmentalized operating costs of the foundry after being adjusted to normal operating conditions as far as possible, are allocated directly to and applied either on a percentage of direct labor dollars or direct labor hour basis. General overhead is applied partially on a basis of weight and in part on the same basis of distribution as departmental expense. In the foundry there exists two main elements of production limitation. One is the melting capacity of the furnaces, and the other is molding floor capacity. Either one of these may have its effect on periodical production costs due to the character of castings to be produced during the particular period. However, all of these varying elements must be ironed out by averaging conditions over a long period of time, when calculating job rates.

In arriving at job rates the important steel foundries are following generally, as they can be adapted, the methods advocated by the Founders Society, but there are still many who are apparently being misled by the use of average actual cost per lb. or ton regardless of the character of each individual casting.

Machine shop cost methods have been developing and advancing likewise through the cooperation of the industries. The cost counsel of the Machinery Builders Society for many years have, through annual and semi-annual conferences, produced a valuable manual on this subject. They discuss everything from direct labor to taxes and interest on investment; however, the words "interest on investment" are the signal for adjournment to the club house for a round of golf. Other associations, including the National Electrical Manufacturers Association and the National Machine Tool Builders Association, have formulated methods that have assisted materially in the improvement of cost accounting in their industries.

Local Conditions Enter

Outright uniformity in cost methods in our industry will not be an accomplishment for many years, if at all, due to the many varying local conditions, their type and form of capital set-up and organization, and the varying character of jobbing work for which each plant is built. However, we

Distribution To Groups	DIRECT LABOR: Direct Labor Oper.	Apprentices	Helpers	Supervision	Clerks, etc.	Checking and Inspect.	Cranemen and	General Help	Carp. Paint and Gen.	General Labor	Machine Tools	Crane Runway, Etc.	Auxiliary, Etc.	Service, Misc.	Dismantling	Maintenance	Tools Lubr. Supply	Fuel for Heating	Shop Office & Man. Mt.	Steam	Water	Power Elec.	Auto Truck and Etc.	Shop General	Compressed Air	Administration	Taxes	Ins. Fire & U & O	Ir. Comp. - Lia.	Depreciation	Rentals	Basis on which Grouped Elements are distributed to Hourly Tool Rates
Direct Labor	▒	▒	▒																												→ Wage Rate of Operators plus direct help
Machine Tool Depreciation																														▒	→ Percentage of Investment in Machines, Motor Foundation and Floor Plate / Normal Hours.
Miscellaneous Facilities											▒	▒	▒													▒	▒			▒	→ To Each Machine in Ratio to Investment / Normal Hours
Crane Service							▒				▒											▒				▒	▒			▒	→ To Each Machine in Ratio to Weighted Assignment / Normal Hours
Building Service														▒		▒										▒	▒			▒	▒	→ To Each Machine in Ratio to Area Assigned / Normal Hours
Repairs to Machine Tools										▒																					→ 5 Year Actual Cost of Repairing Each Machine / Actual Hours Produced in Same Period
Tools, Lubrication and Supplies																▒															→ To Each Machine in Ratio to Investment Hours / Actual Hours for Period Used
Taxes and Insurance																										▒	▒				→ To Each Machine In Ratio to Investment / Normal Hours
Electric Current																						▒									→ Rated Horsepower Each Machine times Rate per Horsepower Hour
General Indirect Expense				▒	▒	▒	▒	▒	▒	▒								▒	▒	▒		▒	▒	▒	▒			▒			→ Total Amount = Flat Rate per Hour Total Machines x Hours

This schedule used in arriving at normal machine tool cost rates indicates the flow and distribution of expenses to be made, giving consideration to varying elements as to each machine.

do find a general tendency toward the machine rate method that allows for variations due to individual machine tool investment, floor space occupied, power, cutting tools, supervision, etc.

This tendency toward a normal machine rate was a change from the earlier average cost of hourly production method, for the reason that conditions of production and distribution in the industry vary so greatly that costs obtained by using current actual rates of indirect factory, or general expense, which are temporarily high or low, resulted in continuously fluctuating costs and often resulting in losses of business as well as in actual completed contracts.

As stated earlier in this paper, our industry produces practically nothing for stock, everything being "tailor-made" so to speak, and rarely is the same product repeated except for later replace parts. It is necessary, therefore, that the estimating department be provided with sufficient recorded job cost experience for their use in estimating future similar jobs. These job costs to be of any value to the estimator or engineer, must be based on normal operations and not on an actual basis that varies and reflects subnormal or abnormal conditions.

This method also facilitates the comparison of job costs of completed contracts with original estimates, variations for the existing operating volume being eliminated.

Use of Normal Rates of Expense in Costs

The Machinery Builders Society, in its manual of cost accounting, has this to say in connection with the use of normal rates of expense in costs:

> It should be recognized that expenses do not fluctuate in parallel with the volume of production and sales, and that the fiscal year is largely an arbitrary period which may not represent average conditions. Also, the benefit of expenditures during one fiscal period may extend to the production and sales of another. For example, the benefits from salaries and wages paid leading personnel during periods of subnormal operations, in order to maintain an efficient and satisfactory organization, often extend to subsequent periods of larger output. Depreciation of property, although entered into expenses in equal instalments, irrespective of volume of output or sales, generally speaking, applies to products pro-rata the total output during the time the equipment is in service. Maintenance expenditures usually apply largely to output of periods previous to those in which they are incurred. Often maintenance work is deferred until periods of low production. In the case of distribution expense, the deferment of the benefits from expenditures is even more pronounced. The results of selling efforts, advertising, etc., of today may not become apparent for several years.
>
> To accomplish the accurate allocation of expenses to the products to which they are applicable, by means of normal or average rates based upon cycles of operations extending over several years, is considered sound accounting and good financial policy. It is recommended, therefore, that:
>
> 1. Normal or average rates of "indirect factory expense" be established for individual departments or classes or product, and used for cost estimates and in costing production and shipments.
> 2. Constant study and comparisons of the production and expense factors to be made by means of charts and statements, so that the established normal or average rates may be periodically corrected, or revised, as experience or conditions over a period of years may require.
> 3. A separate "Unliquidated indirect factory expense" account be set up for each department or class of product, as follows:
>   a. Credit such accounts with amounts over-liquidated, i.e., amounts charged work in process in excess of actual indirect factory expenses, during periods of abnormal production, when the rates used in costing are higher than actual.
>   b. Debit such accounts with amounts under-liquidated, i.e., amounts of actual indirect factory expense in excess of amounts charged work in process during periods of subnormal production, when the rates used in costing are lower than actual.
>   c. The balance in the unliquidated expense accounts, as a matter of good accounting and sound financial policy, should be credited or debited monthly to cost of sales billed as a separate item of such cost.
> 4. Inventories at the close of the fiscal year should be valued for balance sheet purposes, upon the basis of normal rates.

Machine-Hour Rate Method Popular

As the method of applying normal indirect factory expenses, the machine-hour rate method is the most popular. There are, however, conditions which permit advantages in the use of other methods of application, such as "Percentage on direct labor" or "Productive man-hour rate." These latter methods are useful in shops where the size and kind of equipment do not greatly vary or in which only slight variations in direct labor rates permit of a reasonable basis for expense allocation.

The general method used in arriving at normal machine tool cost rates is shown in the formula labeled "Schedule 'A'." In this schedule can be seen the flow and distribution of expenses to be made, giving consideration to the varying elements as to each machine. Ordinarily when normal hours for a tool is referred to, it means a uniform normal for each productive tool in a particular plant. However, there may be good reason for using a higher or lower normal on a particular special purpose tool which may be required to operate at a higher or lower rate than the regular run of tools in that particular shop.

The card of accounts listed at the left of this schedule may not be complete or in such detail as is ordinarily used, but is shown for convenience in illustrating the manner in which the detail production cost may be grouped for distribution to the machine rate. Many variations from this form would, of course, be necessitated to meet local conditions at each plant.

Generally the actual direct labor cost is allocated to the job order to which is added the normal machine tool expense burden. In some cases the total machine tool rate includes a normal direct labor cost. This last method has the advantage in that actual direct labor cost need not be allocated to each job, but only periodically checked with the direct labor amount included in the normal machine rate.

Further simplifications are used in that instead of a separate normal rate for each tool being used, similar rates of not too great a variance are grouped and an average rate applied to all tools allocated to the group.

Charts for Checking and Control

As to the charts and statements used for the constant checking and control of the rate adopted, these may take on many forms. One popular form is a prepared chart for each element of cost in the card of accounts, or for the grouping of the several elements contained in the chart shown. One line will show the expected or, may we call it, budgeted operating ex-

pense for each of the various rates of production, running from somewhere below normal up to a maximum capacity. Another line on the same chart will indicate the amount to be absorbed at the various rates of production. Both lines on charts for elements such as direct labor will follow each other clear across the chart. Variable, semi-variable and constant items will show an unabsorbed cost from zero to normal and overabsorbed from a point above normal.

It is practical to use such charts for detecting changes as they are happening, as well as to point out where operating costs may be avoidably increasing. Allowances again must be made for the type of work and the character of equipment performing the majority of operations during the period. For instance, there are periods where the larger, higher cost tools are in demand, and then other periods when the class of product going through the shops requires principally the lighter tool equipment.

Items such as machine repairs and building maintenance do not lend themselves to monthly checkups, but must rather be made for longer periods of time.

After experimenting with the use of such charts or statements, you can soon arrive at the best form of controlling or checking each of the elements entering into and becoming a part of the machine rate.

Practical simplification should be the keynote of these activities. However, it should be simplification to the point of usefulness, and not to a point at which it will mislead. It seems to me that as accountants we occasionally prepare a report, chart, or statement that we believe should tell the management just what it ought to know. It may be accepted by the management at that time with equal enthusiasm. After a while, some then existing condition changes, and the report is now being placed directly into convenient fire-proof binder by the office boy. Such reports may be called "orphans," and we have no use for them in our organizations. Upon the initiative of the controller's office, our action on any report which we suspicion has lost its usefulness is to discontinue it in that form, or altogether, awaiting reactions. A continuous survey will constantly reveal opportunity for improvement and simplification, whether in machine rate methods or general accounting practices.

Efficient Use of Hours Produced

I have so far referred to methods of arriving at and the control of the machine tool hourly normal cost. Another important item for control is the efficient use of the hours produced. In other words, we want 10 hrs. of work performed in at least 10 hrs. It is important that proper records be set up for time-setting on each operation on each piece to be manufactured, and a subsequent comparison of the efficiency of the operator, the machine, and the department obtained. These efficiency records offer a basis for setting wage rates, premium or bonus payments, and a budgeting of available tool time. They also serve the purpose of indicating from time to time what tools are reaching the end of their efficient usefulness, which taken with their repair records, would be a determining factor in their replacement.

Periodical statements of hourly production and repairs to each machine are important in all of the above procedure.

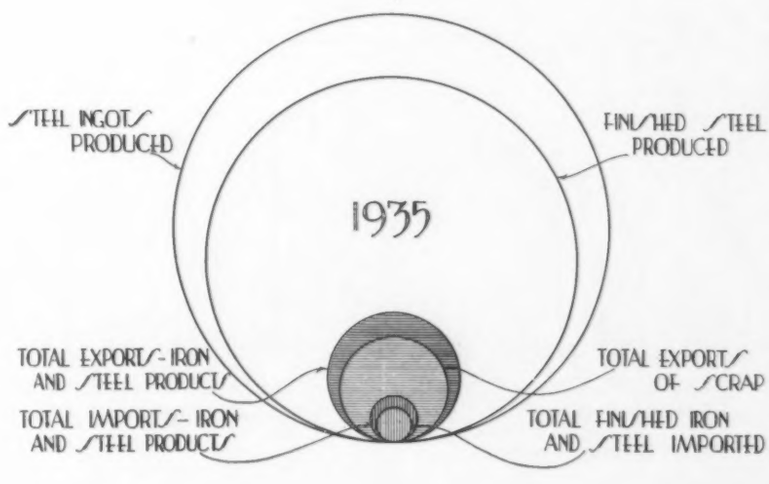
Each month's production is inventoried at normal rates, with variations from actual cost charged or credited either to cost of sales billed during that month or as a separate item in "Profit and Loss" as over or under absorbed burden.

The title of "Sales Billed" generally covers sales completed during the month or period, so that the annual profit and loss statement includes only contracts or separately priced units thereof completed during the period. Consequently, annual sales billed in any company in our industry may represent considerably more or less than the actual shop production. It is considered good and conservative accounting, however, to charge off or credit such profit or loss with the under or over absorbed burden actually sustained in the period of the statement.

I might also add, that in our industry, estimates for prices are often based on preliminary layout drawings that are detailed only after securing the contract. Engineering development frequently determines a detail design entirely unforeseen at the time of the original estimate. I simply mention this as one of the many complexities of the foundry and machine shop industry.

Steel Production—Exports—Imports

A UNIQUE method developed by the Department of Commerce to show the relationship between domestic steel production, exports and imports, and the role scrap plays in these totals. Note that scrap exports make up the bulk of total foreign shipments, and that imports of finished iron and steel are considerably less than exports. The areas of the circles are proportional to the actual tonnages involved.


STEEL INGOT PRODUCED
FINISHED STEEL PRODUCED
1935
TOTAL EXPORTS - IRON AND STEEL PRODUCTS
TOTAL IMPORTS - IRON AND STEEL PRODUCTS
TOTAL EXPORTS OF SCRAP
TOTAL FINISHED IRON AND STEEL IMPORTED

Steel Output in First Half Was A

FIRST-HALF production of iron and steel indicates that hard times may be over for the steel industry temporarily at least. The first six months of 1936 have passed, and ingot output made a very creditable showing. It was well above the average level of the past five years, above the level of the past 10 years, and above that of the past 15 years. In this span are included good, bad and indifferent times. Only the five good years from 1926-30 inclusive stood higher.

If, however, this period be included with the five following depression years to strike a 10-year average, then the first half of 1936 can lay claim to being an above-normal half-year. By the same token, the depression in steel lasted exactly half a decade and was preceded by half a decade of boom activity. Prior to that occurred a five-year stretch in which business moved along at a near-normal rate, normal, in this instance, being the production average between five good and five bad years. (The chart shows the proximity of the 1921-25 average line to the succeeding 10-year average line.)

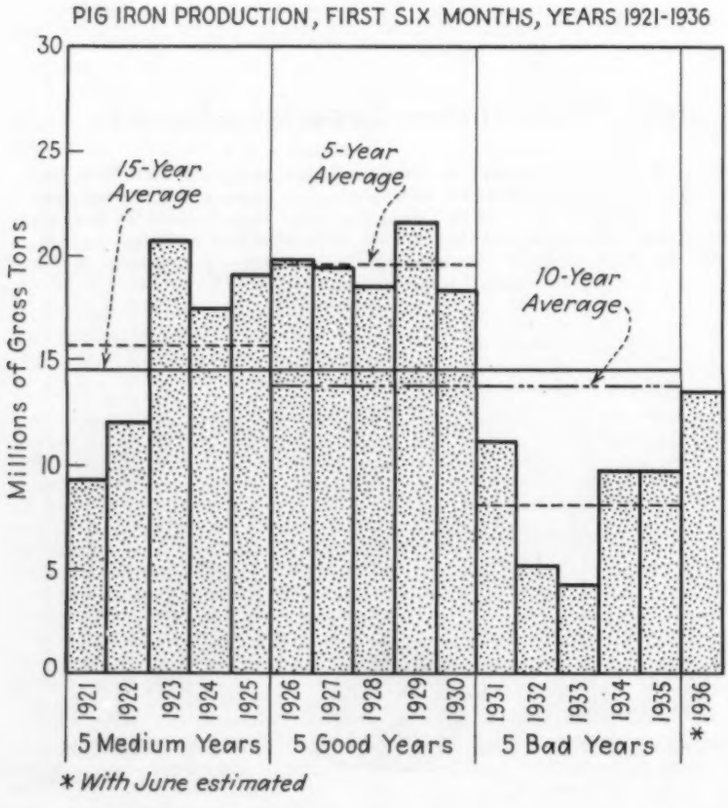
Pig Iron Record Less Imposing

With respect to pig iron, the record is less imposing. First half-year production figures show that, while the 1936 output has safely topped comparable figures for the past five years, it hasn't quite come up to the 10-year compromise reckoning of the period 1926-35 inclusive. Its failure to recover correspondingly with ingot volume can be attributed partially to expanding use of scrap in steel furnaces.

The accompanying charts show this discrepancy clearly. In pig iron half-year production has been above the level of the past five years, but beneath all other averages shown on the chart.

All Types of Steel Included

The charts and tables referred to, which accompany this article, are based on production figures for the first six months of the years included. This procedure was



Pig Iron Production—First Six Months

Year	Production (M.G.T.)	Ratio 1936 Production to Former Years
1921	9,428	144
1922	12,050	112
1923	20,841	65
1924	17,434	78
1925	19,012	71
Aver. 1921-1925	15,753	86
1926	19,848	68
1927	19,431	70
1928	18,521	73
1929	21,621	63
1930	18,261	74
Aver. 1926-1930	19,536	69
1931	11,105	122
1932	5,168	262
1933	4,441	305
1934	9,798	138
1935	9,799	138
Aver. 1931-1935	8,062	168
Aver. 1926-1935	13,799	98
Aver. 1921-1935	14,451	94
1936	13,546*	100

*With June estimated.

Above 15-Year Average

By N. E. MACMILLAN

adopted so as to obtain an immediate, and therefore useful, impression of current activity in iron and steel. To have employed annual figures would have involved the use of nebulous estimates for 1936. As is, only a minor estimate affecting June figures is involved. With respect to steel ingots, June output was conservatively estimated on the basis that per cent of capacity operations averaged 70 during the period. In all probability, the official figure, when released, will show a greater volume. Pig iron output for June was estimated lower than the May figure.

Steel ingot figures include bessemer, open-hearth, electric and crucible production. Pig iron figures embrace all types, excepting charcoal iron, an inconsequential factor.

More Electric Steel

Careful analysis of electric and crucible ingot statistics, production of which is reported annually only, not intermediately, showed that in the past 15 years these types of furnaces have tripled their share of the country's total steel ingot output. In recent years this ratio has tended to increase uninterruptedly. A slight relative advantage over 1935 was therefore accorded the current year in forming the necessary estimate of crucible and electric activity.

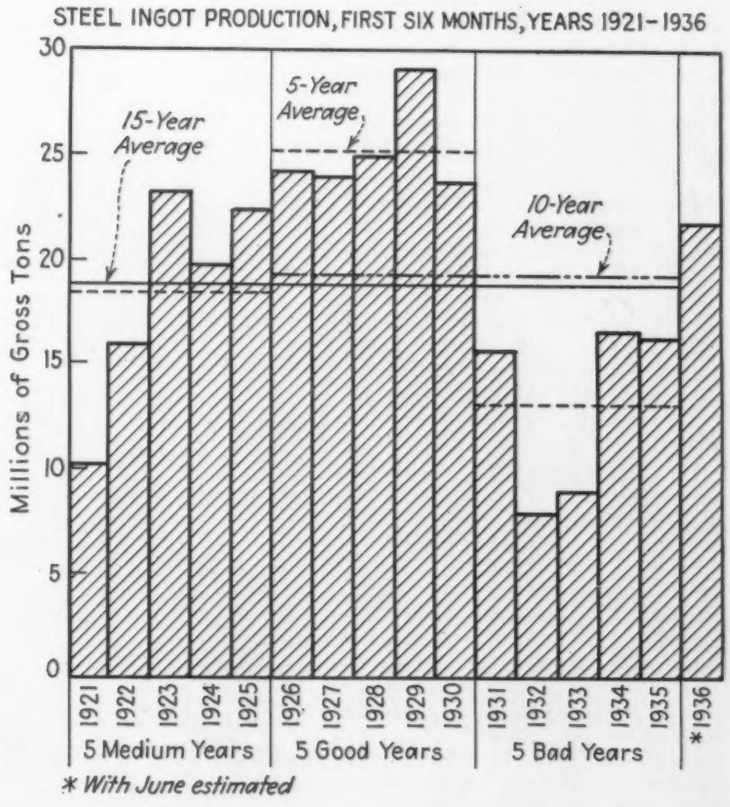
Together they were taken to represent 1.691 (1.7) per cent of total ingot production in six months this year. The known ratio for 1935 was 1.639. The tonnage specified is so small as hardly to exert an influence, but is mentioned because the fact may be of some innate interest. As between crucible and electric steel ingots annually produced, the former now account for not more than 0.123 per cent of the combined total. In 1923, however, crucible output represented 13 per cent, electric claiming but 87 per cent of their combined total.

Accordingly, it goes without saying that, relative to all types of steel ingots—bessemer, open-hearth, electric and crucible—the influence of the last-mentioned is essentially nil. Electric furnaces,

Steel Ingot Production—First Six Months

Year	Production (M.G.T.)	Ratio 1936 Production to Former Years	Per Cent of Capacity
1921.....	10,290	212	...
1922.....	16,027	136	...
1923.....	23,327	93	83.5
1924.....	19,737	110	69.5
1925.....	22,383	97	76.9
Aver. 1921-1925	18,354	119	76.6†
1926.....	24,154	90	86.8
1927.....	24,015	91	83.1
1928.....	25,027	87	84.2
1929.....	29,234	74	95.0
1930.....	23,764	92	75.6
Aver. 1926-1930	25,239	86	84.9
1931.....	15,704	139	47.1
1932.....	7,777	280	22.8
1933.....	8,992	242	26.5
1934.....	16,629	131	48.1
1935.....	16,293	134	46.9
Aver. 1931-1935	13,079	166	38.3
1926-1935	19,159	114	56.0
1921-1935	18,890	115	63.5‡
1936.....	21,763*	100	62.7*

†Aver. 1923-1925.
‡Aver. 1923-1935.
*With June estimated.



with roughly 1½ per cent of the total, are as yet in their infancy, but are of growing importance.

Broader Analysis

Reverting once more to the broader aspects of the present situation, the accompanying tables will prove helpful in making a long-term analysis. The tonnage of steel ingots produced in the first half of 1936 is given as 21,763,000 gross tons, while for pig iron the figure is seen to be 13,546,000 tons. Corresponding figures are listed for all previous years back through 1921, together with appropriate periodic averages. Opposite these years is shown the ratio of the 1936 volume to each.

Thus, it is seen that 1936 to date has turned out 280 per cent as much ingot steel as was produced comparably in 1932. Blast furnaces have made 262 per cent as much pig iron. Similarly, current output has failed by 26 per cent to measure up to the volume of steel produced in 1929, and by 37 per cent in the case of pig iron.

Long term activity is shown to be inferior to the present status in steel. The five-year average of the depression has been exceeded by 66 per cent, the 10 representative years by 14 per cent and the 15-year cycle by 15 per cent. Blast furnace output has topped the average of the past five years by 68 per cent, but has fallen 2 per cent beneath the 10-year level and 6 per cent beneath the 15-year level. It is interesting, however, to note that, whereas the steel ingot ratios are larger in the case of each year from 1921-32 than those for pig iron, the situation reverses itself thereafter.

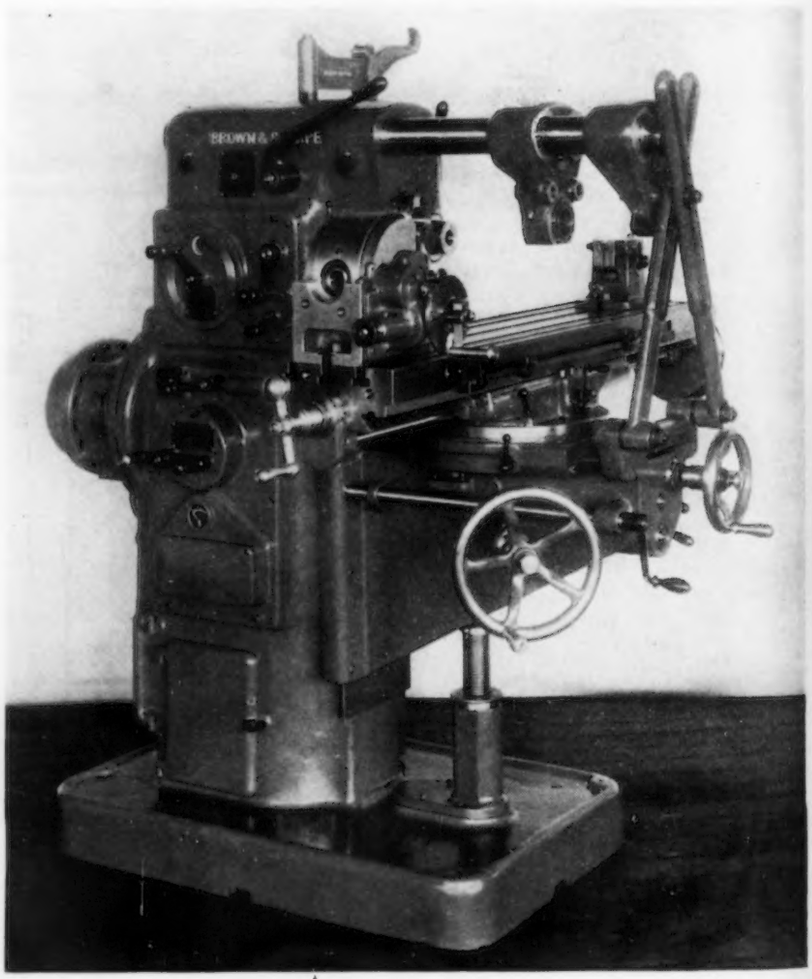
Included in the ingot table, partly as a matter of record, are operating figures in per cent of capacity. If the ratios had been worked out on this basis, then, due to introduction of the variable, capacity, the current year's status would suffer comparatively to some extent. But this would assume significance only as comparisons were traced back, say, into the twenties when mill capacity was noticeably less than it is today. After 1930, discrepancies would tend to iron out, and operating ratios, if calculated in terms of capacity, would conform approximately to the production ratios tabulated here. Relative to the five bad years, 1936 would still retain its advantage of approximately 65 per cent. Relative to the past 10 years, it would still show an increase of better than 10 per cent. Its ratio to the 15-year period would recede somewhat, but would level off at a figure of about 100 per cent.

Modern Finishes and Methods Dress Up the Machine Tool

FORMERLY all machine tools were finished with oil-type paints which were not only slow handling and drying, but often broke down under chemicals and cutting oils. Lacquers have replaced these in many instances. These are highly resistant to abrasion and chemicals, but have the disadvantage of requiring spray application for obtaining a suitable finish. Today, synthetic type finishes are becoming standard in many machine tool shops because they may be sprayed, brushed or dip applied. Small parts are more conveniently dipped, and may be finished "in line," avoiding the necessity of transferring these to an elaborate finishing department, and avoiding the need for anything but the simplest arrangements. Synthetic finishes are highly resistant to alkalis, lubricating and cutting oils and wear. They are also applicable to all types of tools and equipment and produce a finish of exceptional smoothness and beauty. Pictured are various stages in the finishing of machine tools as carried out by a leading milling machine manufacturer.

o o o

THE finished machine. A wash coat of white shellac covers all puttied areas. No. 100 emery cloth is used for smoothing. The surface is cleaned with V.M.P. Naphtha. A finishing coat of synthetic enamel completes the job.



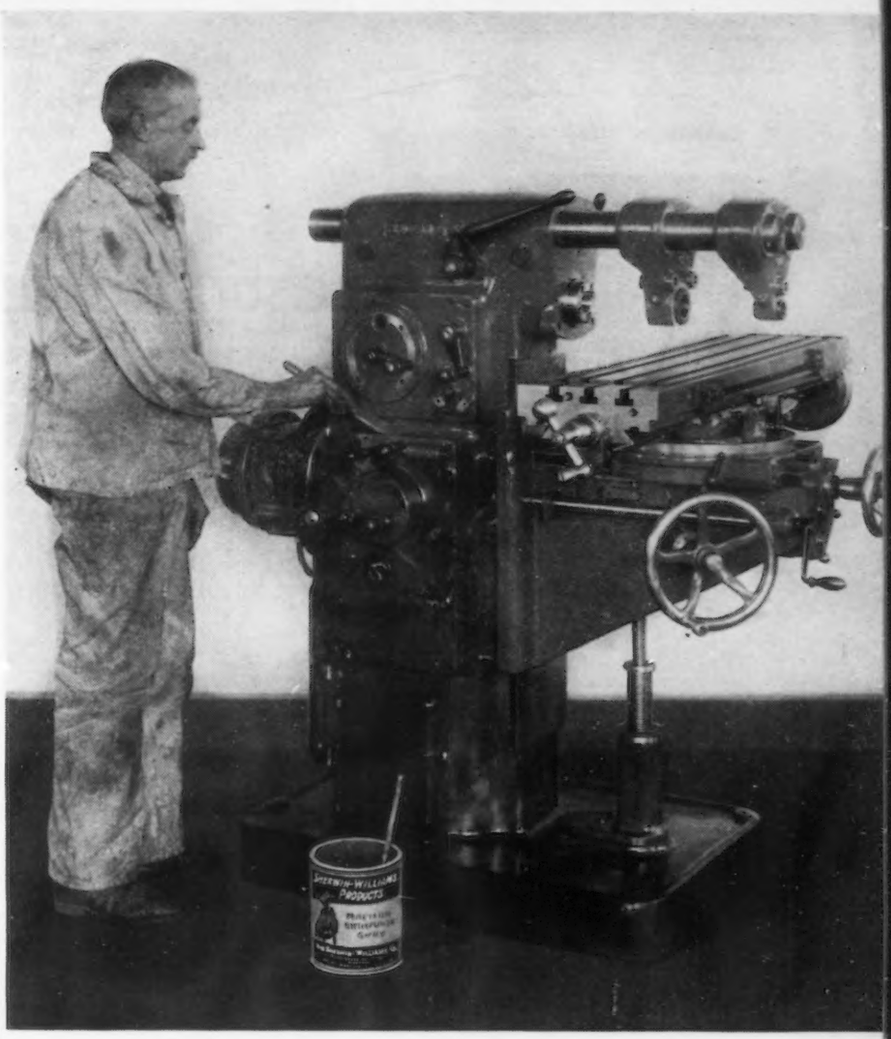
AT RIGHT

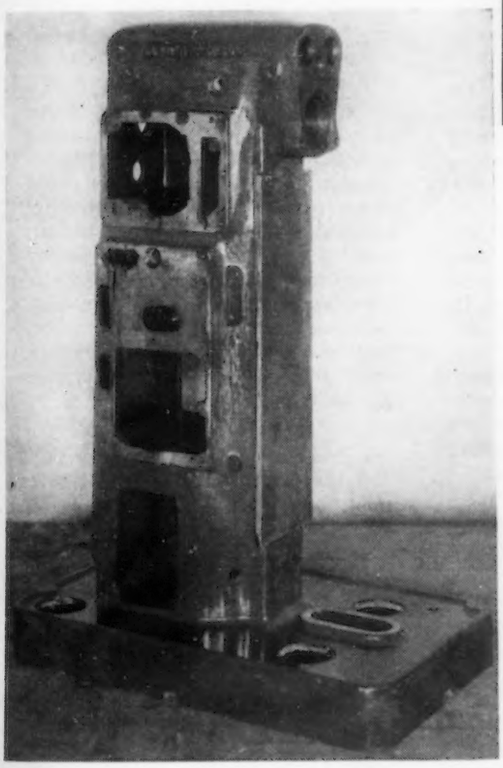
AFTER sanding the filler coat, a synthetic sealer coat, highly resistant to cutting oils, compounds etc., is applied. This coat protects the filler coat during assembling and testing operations. Breaks and blemishes are puttied.

o o o

BELOW

SHOWING a milling machine casting smoothed down after receiving coat of machine primer brushed on, and a filler coat which is knifed on. The latter is smoothed by brushing with a solvent.





o o o

AT RIGHT

CASTINGS are first snagged or sand-blasted to smooth the surface imperfections. Large castings are sprayed with weather-resisting primer which prevents rusting during storage or handling. Small castings are dipped.

Testing Society Starts New Year at Atlantic City

A. C. FIELDNER
President for 1936-1937

T. G. DELBRIDGE
Vice-President, 1936-1937-1938

PERHAPS it was a program replete with interesting papers; perhaps A.S.T.M. members are more prosperous; or it may be that an opportunity to start off the summer's tan with a good burn was too attractive to pass up. The first cause is preferred by officials of the American Society for Testing Materials. In any case these same officials point with pride to last week's record attendance figure for the annual five-day session at Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.

This record registration is particularly pleasing in view of the absence of an equipment exhibition. Attendance of 1200 this year compares with 1012 registered at Detroit last year and 823 attending the 1934 sessions at Atlantic City.

Last week's 39th annual meeting of the society included 18 formal sessions and some 175 committee meetings. In addition, time was given to wind up a year's business for the society and install new officers.

The 11th Edgar Marburg Lecture, entitled "Developing American Glass" was presented by Dr. A. L. Day, director of the geophysical laboratory, Carnegie Institute, Washington. The society's one award, the Dudley Medal, went to H. C. Mann, research engineer, Watertown Arsenal, in recognition of a paper he presented a year ago entitled "The Relation Between the Tension Static and Dynamic Tests."

Approach to Social Problems

The opening session of last week's meeting was featured by addresses by Dr. H. C. Parmelee, McGraw-Hill Publishing Co., New York, and by the retiring president of the A.S.T.M., H. S. Vassar. Mr. Vassar's talk was of particular interest inasmuch as it drew parallels between the standardization work of the society and possible lines of attack in solving the vexing social problems of today.

Illustrating the scientific approach, Mr. Vassar said: "Innumerable influences are continually at work on each of us in shaping our attitudes toward social questions. How the power of tradition, and social and business environment, gives our minds a permanent set 'for' or 'against' any particular course of action, regardless of its merits, needs no comment. In the field of physical science our individual usefulness is usually directly proportional to our ability to control these preconceived opinions, which are so often mere prejudices with little, if any, foundation in reason or fact. Is it less necessary to approach the testing of non-materials with a fairly open mind?

"Much is being said about security—social security as represented by old age and unemployment insurance; financial security as represented by the guaranteeing of bank deposits and loans. Every group, regardless of its place in the business or social scale, apparently wants some form of security and wants Uncle Sam to attend to it. The vision of an economic Santa Claus seems to have permeated all groups of society.

"With what kind of testing equipment do we approach these questions?

"In the matter of fomenting racial, national and class hatreds, at present one of our highly popular forms of stirring up trouble—as if we did not already have enough—where do we as technologists stand? Are we following the popular pattern of behavior by joining in the various crusades of discord and hatred, or are we striving against our traditional and acquired prejudices, toward a just evaluation of individuals and groups?

"The world today worships force as an instrument for the settlement of all human differences. This is evident not only in the international armament race, but in attempts by groups in every field of human activity to curb by force, possibly in the form of legal enactment, the liberties of other groups who may in some way disagree with them. Our common expression, 'There ought to be a law,' voices this sentiment.

"As members of A.S.T.M. we would laugh at the suggestion that in attacking a new and controversial subject in one of our standing committees we at once plunge into a battle of words on the most disputed points, without first having established a common ground made up of those things which we have found ourselves already in fair agreement. Yet is it not too frequently considered quite proper to initiate the consideration of a social question with a battle of words?

"We have in this country several hundred associations of specialists in science and technology, with an aggregate membership of hundreds of thousands. In the treatment of the physical problems in their respective fields, a reasonably successful technique has been developed. If you like, you may call this 'the scientific approach,' but perhaps 'common sense' would be

just as good a name. Unless we are willing to admit the truth of the charge that we have degenerated into a nation of cynical materialists, devoid of those characteristics of our forefathers of which we boast, is there any valid reason for abandoning our methods of approach when stopping, as we must, from our vocation into the non-materials or social field?"

New Officers

The new president for the next 12 months, A. C. Fieldner, is chief engineer of the experimental stations division of the United States Bureau of Mines. He was graduated from Ohio State University in 1906, and in 1910 joined the newly created Bureau of Mines. In 1925 he was appointed chief chemist of the bureau, and in 1927 he was placed in administrative charge of the bureau's experimental stations division, with headquarters in Washington. Mr. Fieldner has been active in developing standard methods and apparatus for analyzing coal; has directed the bureau's investigations on the ventilation of vehicular tunnels and has been the author and co-author of many scientific and technical papers.

For the next two years T. G. Delbridge, manager of the research and development department, Atlantic Refining Co., will serve as vice-president. Dr. Delbridge was graduated from Union College in 1903, was an instructor in chemistry at Cornell University until 1909. He then joined the Atlantic Refining Co. and became manager of research in 1923. His research activities have embraced a wide field of petroleum investigations, and he has contributed especially to developments in distillation methods, solvent refining (the nitrobenzene process), wax manufacturing and methods of testing.

The five new members of the executive committee, who will serve two-year terms, are O. U. Cook, assistant manager, department of metallurgy, inspection and research, Tennessee Coal, Iron and Railroad Co.; H. F. Gonnerman, manager, research laboratory, Portland Cement Association; C. S. Reeve, manager of research development, Barrett Co.; F. E. Richart, research professor of engineering materials, University of Illinois; and F. M. Waring, engineer of tests, Pennsylvania Railroad Co.

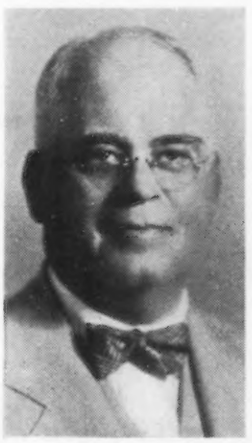
X-Ray Symposium

With the exception of the symposium on effect of temperature, sponsored jointly by the A.S.M.E. and the A.S.T.M. in 1931 at Chicago, the X-ray symposium at last week's meeting was the most extensive of any the A.S.T.M. has yet developed. Up to this time there has never been in English-speaking countries a symposium on the use of X-rays in the examination of materials, and, while the Germans have held yearly symposiums on the subject and published certain volumes which are useful for those who can read German, it is anticipated that the papers and discussions given in the A.S.T.M. symposium will serve a most useful purpose.

The general tenor of the symposium was one of the usefulness of X-rays in the examination of materials. The specific papers presented in the radiographic sessions were as follows: "The Principles of the Radiographic Process," by John T. Norton, Massachusetts Institute of Technology; "Foundry Applications of Radiography," by Earnshaw Cook, American Brake Shoe & Foundry Co.; "Radiography in the Welding Shop," by J. C. Hodge, Babcock & Wilcox Co.; "Miscellaneous Applications of Radiography and Fluoroscopy," by Herman E. Seemann, Eastman Kodak Co.; "Gamma-Ray Radiography and Its Relation to X-Ray Radiography," by Norman L. Mochel, Westinghouse Electric & Mfg. Co.; and "Problems of Radiographic Specifications," by H. H. Lester, Watertown Arsenal.

The sessions on X-ray diffraction methods featured six formal papers, as follows: "Equipment and Methods," by Charles S. Barrett, and six collaborators; "Constitution of Alloys," by Kent R. Van Horn, Aluminum Co. of America; "Chemical Analysis by X-Ray Diffraction Methods," by Wheeler P. Davey, Pennsylvania State College, and five collaborators; "Applications of X-Ray Methods to Problems of Cold Work, Preferred Ori-

(CONTINUED ON PAGE 84)



O. U. COOK
Elected to Executive Committee

H. F. GONNERMAN
Elected to Executive Committee

C. S. REEVE
Elected to Executive Committee

F. E. RICHART
Elected to Executive Committee

F. M. WARING
Elected to Executive Committee

THIS WEEK ON THE ASSEMBLY LINE

. . . Production holds above 100,000 mark; July schedules show little drop.

o o o

. . . Specifications on 1937 models not to appear in volume until latter part of month.

o o o

. . . Auto unions start membership drive, backed by Lewis group.

o o o

. . . Radio and loudspeaker trucks will figure in campaign to enlist auto workers on 10-point objective program.

DETROIT, July 7.—Production of passenger cars and trucks in the United States and Canada continued above the 100,000 mark last week. The total was 100,697 units. Activity at the Ford Rouge plant remained on a five-day basis for the second week, and the fact that Ford recently bought steel for an additional 50,000 units in the 1936 run indicates that this five-day rate may be continued during the month. Retail sales of passenger cars in Wayne County showed a gain of 38 per cent for the month over June, 1935, the increase being attributed largely to bonus disbursements. Manufacturers of cars in the medium-price class, from Dodge up through Buick, are still working against banks of undelivered orders, and have postponed tentative dates for the model change-over shutdown several times. A rough survey indicates that total July production will be close to 390,000 units, which would be only about 15 per cent under the June figure.

August, on the other hand, is expected to be a very low month from the production angle. Most change-over work will be carried through during this period, although assembly lines will continue to operate. Car manufacturers are faced with the tremendous problem of getting new equipment in place and tuning it up for 1937 model jobs, without leaving their dealers short of cars during October. Machinery manufacturers are being pushed on deliveries of new equipment, and those that have contracts for rebuilding equipment now in production are wondering how they can meet these contracts in the short period allotted them.

A slight breathing spell has set in in the steel market in Detroit after a grand scramble on the part of many manufacturers to come in on second-quarter prices before the bars were finally dropped. Manufacturers who were able to, bought ahead on '37 model specifications, although in the final analysis this business did not amount to a great deal on a percentage basis. Several large-sized orders which came in toward the end of the month were for steel on extension of runs on '36 model cars. Ford Motor Co.'s buy is such an example. Both General Motors and Chrysler units made buys on materials representing extensions of original schedules on present models. The month of July is expected to be a rather quiet month from an order point of view, since it will be well toward the end of the month before specifications for '37 models are issued in volume.

The only possible factor that could change the situation would be rapid developments in the labor situation at the mills. This might influence buyers to rush through their specifications ahead of time in order to get sufficient stock to start the first run in the early fall. In fact, in some circles the recent buying on the part of Chrysler Corp. is attributed as much to this reason as to the change in third-quarter prices. It is still expected, however, that there will be sporadic clean-up buys made in the next week or so, since there have already been a number of postponements of the summer shut-

downs. This has been due to the brisk retail trade in motor cars.

Auto Union Drive

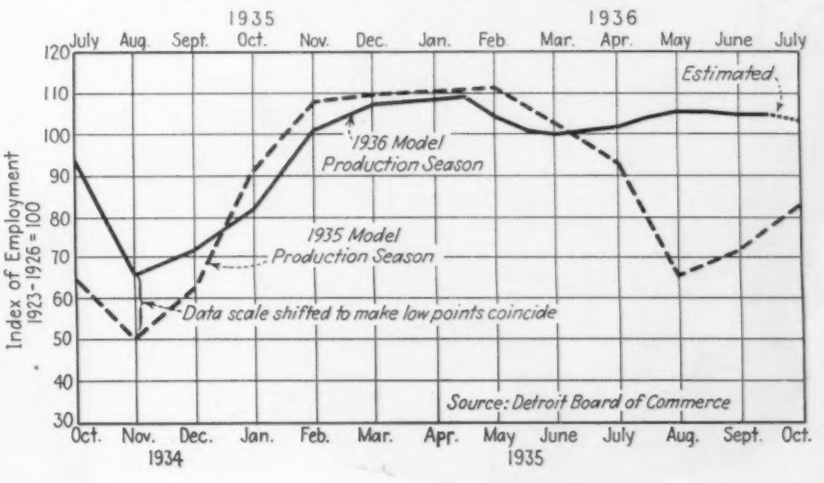
Coincident with the start of a campaign to organize the steel industry, there began on July 1 a similar organizing campaign by the United Automobile Workers of America, A. F. of L. affiliate, with headquarters in Detroit. On the same date there was officially brought into the organization the membership of 26 locals of the Automotive Industrial Workers Association, headed by Richard Frankensteen, who, incidentally, is to be the chief organizer for the U.A.W. in the Detroit area. Three locals of the M.E.S.A. and the Hudson local of the Associated Automobile Workers also were brought into the U.A.W. at this time. Their combined strength rose to an estimated 60,000 dues-paying members. Industrial relations men place the total membership as low as 4300, however, Like the steel drive, the campaign in the automotive industry will be backed by representatives of John L. Lewis' Committee for Industrial Organization. Directly in charge will be Adolph Germer, a professional organizer for the United Mine Workers, and Leo Kryzski, officer of the Amalgamated Clothing Workers, who is also "advising" in the steel mill drive. Ed Hall, second vice-president of the U.A.W., is to take charge of the drive in Indiana, including such cities as LaPorte, Anderson, Muncie, Newcastle and Fort Wayne. An intensive drive is said to be under way in Flint and Pontiac plants under the leadership of Wyndham Mortimer, first vice-president of the U.A.W.

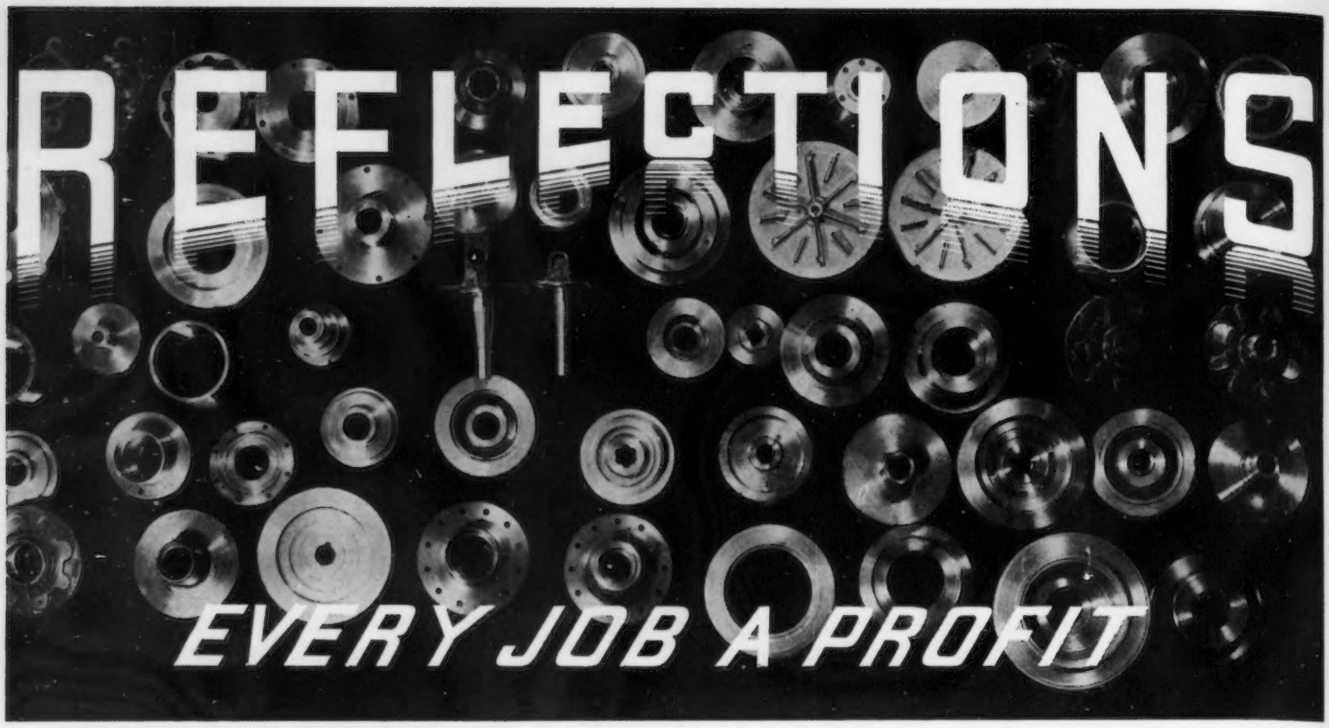
In Detroit the campaign was led off by a radio broadcast last Friday night, and it is planned to continue these broadcasts twice a week for an indefinite period. There are also to be a series of open-air mass meetings, the first to be held in Chandler Park on July 9. Various union officials will speak. It is anticipated that John L. Lewis will visit Detroit to speak before another open-air mass meeting some time around the middle of the month.

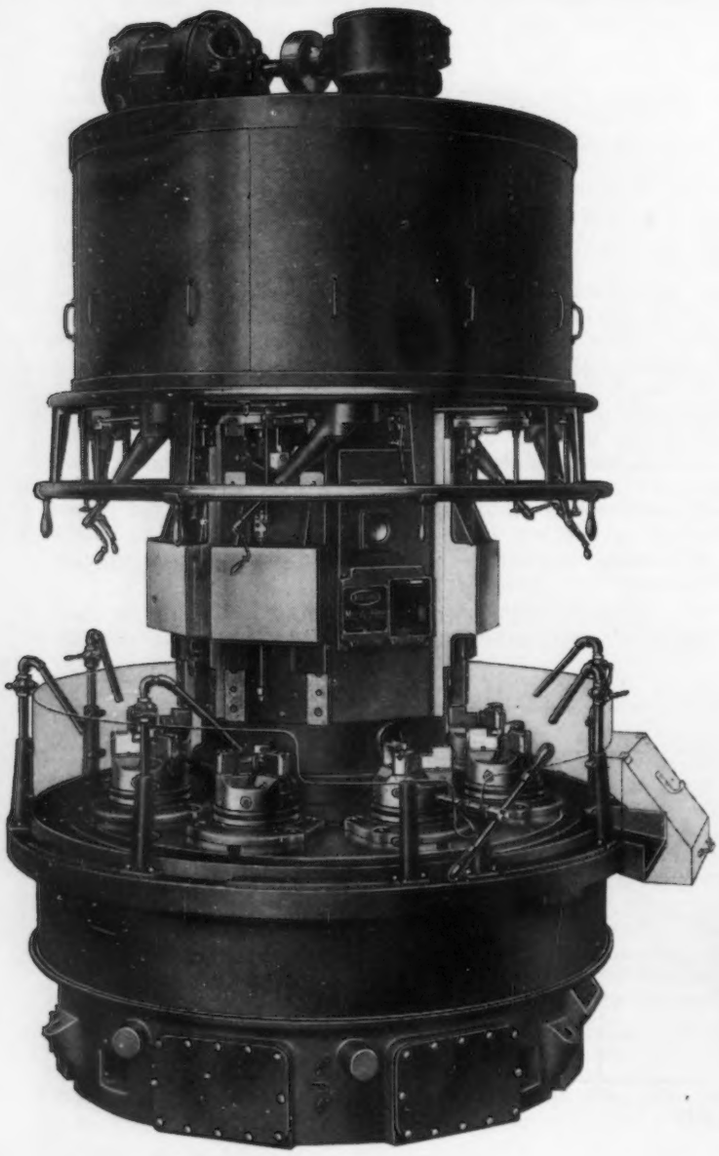
Already the groundwork is being laid to gather pertinent data useful in a drive of this kind concerning parts plants in this vicinity. A questionnaire was sent around to local plant organizers last week calling for data as to the size of the company, number employed, its product and principle customers, information as to the availability of vacant lots in the vicinity for use of cars with loudspeaking units and the general attitude of local store owners toward the union.

This will not be the first attempt to organize the automotive industry. Under the sponsorship of the N.R.A., a real concerted effort was made to line up workers in various A. F. of L. locals and independents, and for a while considerable success was attained in building up a substantial number of dues-paying members. This membership rapidly dwindled to practically nothing, however, when the original organizer, known as a go-getter, was ousted politically from his job, and a racketeering element took control of the situation. This soon became known to the workers, who lost all interest in paying dues, particularly when the codes were giving them advantages which organized labor had not been able to obtain through its own efforts over a

INDUSTRIAL EMPLOYMENT, DETROIT
ADJUSTED FOR COMPARABLE SEASONABLE ACTIVITY







Reflections on Mult-Au-Matic Performance result in the answer "Every Job a Profit".

In many cases results are based on volume production of a specific job.

In others Savings are made on shorter runs of variety work. As a matter of fact one manufacturer states that with his Mult-Au-Matic tooling he can set up at a Profit for a run of less than twenty pieces on each of several jobs.

Flexibility of machines and tooling makes for Practical and Profitable Performance with "Every Job a Profit".

Reflect—Time Saved is Money Earned—Save Time by asking Bullard Engineers for Estimates on Mult-Au-Matics as applied to your jobs.

THE BULLARD COMPANY

BULLARD

BRIDGEPORT, CONNECTICUT

quarter of a century of campaigning.

Ten-Point Program Initiated

Last April in South Bend a new group came into control of the lethargic U.A.W. Homer Martin, former Methodist minister is at its head. While the manufacturers have labeled this group radical and Communistic, impartial observers agree that this new element, composed of men free from A. F. of L. traditions, are sincere in their views and are not primarily inspired by the motive of keeping their jobs through agitation and initiation of industrial strife. This group has set up as its long term objective, a 10-point program for the automotive industry, as follows:

(1) An annual wage of $2,000; (2) quarterly bonus on profits; (3) vacations with pay; (4) adoption of the 30-hour week with no reduction in the present weekly pay; (5) "straight" seniority rights; (6) "true" collective bargaining; (7) protection of workers against occupational disease; (8) control of the "speed-up" on assembly lines; (9) social and economic security, including unemployment, old age and accident insurance; (10) social justice for all.

As has been indicated in these columns before, an annual wage of $2,000 in the automotive industry is being approached this year, based, of course, on a working week of 40 hours or more. To assume that such a wage could be achieved on a 30-hour week, considering that there is always a period when shut-down is inevitable, would mean an average hourly rate in excess of $1.35, which is so far above the present level as to be achieved, if at all, only over a long period of time. At least one automobile company, Packard, has announced a plan of vacations with pay for its workers, and it would not be surprising to see this trend followed in other plants. In recent years the manufacturers have also been adhering rather closely to a plan of seniority rights first set up under the now defunct Automobile Labor Board. One of the features of this plan is the recognition of the so-called Class "D" man, the all-around worker who is essential to the operation of the plant even during the periods of shut-down and change-over, and who is retained on the payroll irrespective of his length of service.

Collective bargaining programs have been in effect in most of the larger plants in Detroit and vicinity, with the exception of one important manufacturer. From what can be gathered, they have worked effectively. Elections of representatives have not been dictated by the management, and the men have been allowed to speak plainly in these works councils. In fact, the management has found it an extremely effective way of keeping in touch with employee unrest and taking care of any reasonable demands before they become the basis for mass action.

Bendix Situation

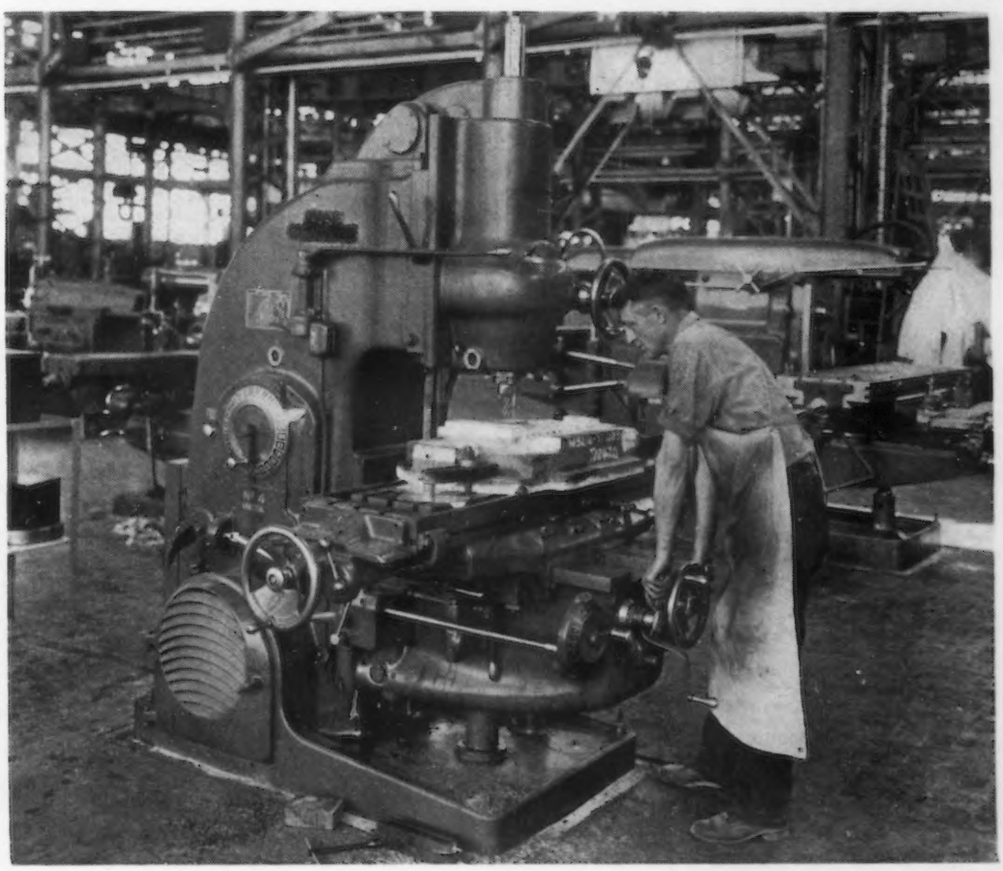
Labor leaders, of course,will argue against such a contention, and point to the recent trouble at the Bendix plant in South Bend as an example of a situation where collective bargaining did not exist in fact. Because the workers felt that they were not getting proper consideration on their complaints to the management, the situation was brought to the point where a strike was voted. The men were ready to walk out, but the timely intervention of Vincent Bendix and negotiations with officials of the U.A.W., who had been trying unsuccessfully for a week to get a hearing from the local management mollified their unrest. The settlement that followed these negotiations involved the recognition of the right of such outside union officials to enter into the dis-

(CONTINUED ON PAGE 100)

o o o

PRODUCTION of small body dies is being started at the new Grand Rapids Stamping Division of General Motors. This vertical milling machine is typical of the heavy-duty equipment recently purchased, including also a battery of shapers, giant planers and planer-type millers, besides Keller automat'c profilers yet to be installed.

o o o



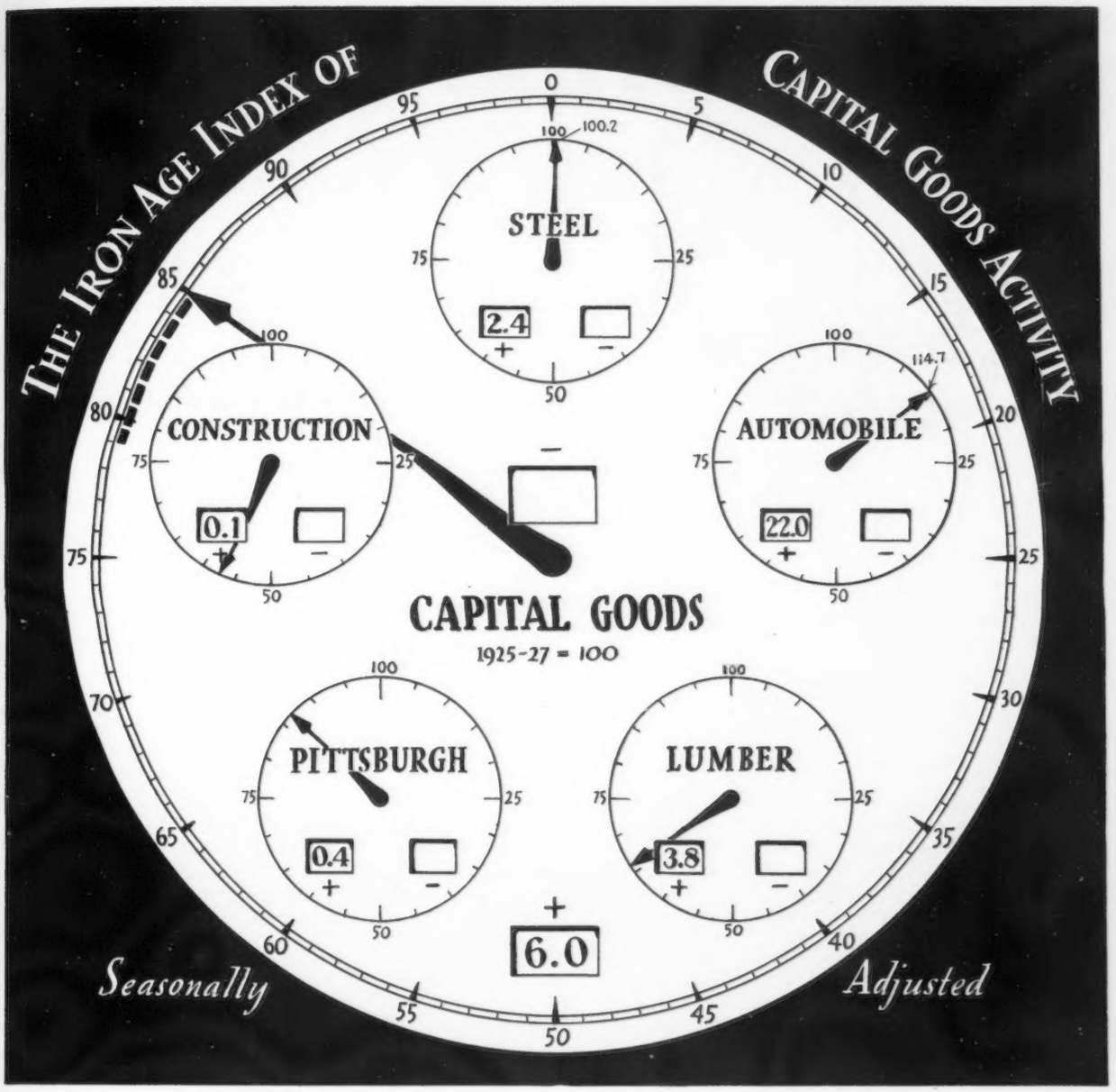
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	May, 1936	April, 1936	May, 1935	Five Months, 1935	Five Months, 1936
Raw Materials:					
Lake ore consumption (gross tons)[a]	.....	3,485,293	2,466,585	12,157,235	.....
Coke production (net tons)[b]	3,837,323	3,554,617	2,850,236	14,362,635	17,502,489
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,648,401	2,403,683	1,727,095	8,246,486	10,887,986
Pig iron output—daily (gross tons)[c]	85,432	80,125	55,713	54,612	71,631
Castings:					
Malleable castings—production (net tons)[d]	45,027	50,954	34,729	204,349	230,326
Malleable castings—orders (net tons)[d]	.....	47,933	31,136	194,560	.....
Steel castings—production (net tons)[d]	64,246	63,087	30,646	153,260	271,259
Steel castings—orders (net tons)[d]	63,950	83,188	29,083	152,113	329,199
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,046,253	3,942,254	2,633,661	13,783,987	17,341,490
Steel ingot production—daily (gross tons)[e]	155,625	151,625	97,543	106,031	133,396
Steel ingot production—per cent of capacity[e]	70.91	69.09	44.06	47.90	60.78
Finished Steel:					
Trackwork shipments (net tons)[e]	7,314	7,031	4,228	17,365	28,085
Steel rail orders (gross tons)[e]	8,800	150,057	28,215	252,807	583,148
Sheet steel sales (net tons)[f]	191,511	190,269	149,725	1,016,028	946,647
Sheet steel production (net tons)[f]	224,056	217,975	191,507	1,082,584	1,064,210
Fabricated shape orders (net tons)[g]	145,553	*104,849	60,448	398,300	612,249
Fabricated shape shipments (net tons)[g]	134,623	*127,793	84,115	413,030	516,768
Fabricated plate orders (net tons)[d]	49,285	29,900	17,630	81,548	175,511
Reinforcing bar awards (net tons)[e]	19,725	26,700	12,080	99,920	162,090
U. S. Steel Corp. shipments (tons)[h]	984,097	979,907	598,915	2,975,891	4,145,285
Ohio River steel shipments (net tons)[i]	86,004	74,110	78,106	328,028	356,166
Fabricated Products:					
Automobile production, U. S. and Canada[k]	480,571	527,726	385,427	1,996,180	2,125,422
Construction contracts, 37 Eastern States[j]	$216,070,700*	$234,631,600	$126,720,100	$548,501,600	$996,523,600
Steel barrel shipments (number)[d]	721,021	730,099	554,102	2,531,234	3,143,629
Steel furniture shipments (dollars)[d]	$1,451,199	$1,633,633	$1,214,163	$5,761,399	$7,741,223
Steel boiler orders (sq. ft.)[d]	723,343	783,961	643,154	2,281,288	3,530,731
Locomotive orders (number)[m]	10	15	2	13	98
Freight car orders (number)[m]	9,677	3,650	2	1,432	22,234
Machine tool index[n]	118.9	125.7	73.3	†67.1	†116.6
Foundry equipment index[o]	165.4	134.0	100.7	†94.4	†138.1
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	59,391	49,277	47,719	149,655	259,235
Imports of pig iron (gross tons)[p]	15,296	11,982	23,174	46,903	80,714
Imports of all rolled steel (gross tons)[p]	20,994	23,847	18,939	73,355	108,053
Total iron and steel exports (gross tons)[p]	314,950	301,987	286,599	1,306,354	1,336,640
Exports of all rolled steel (gross tons)[p]	93,686	101,522	62,161	345,994	432,927
Exports of finished steel (gross tons)[p]	86,346	90,116	56,612	304,956	399,780
Exports of scrap (gross tons)[p]	217,439	190,845	209,425	900,844	885,762
British Production:					
British pig iron production (gross tons)[r]	661,000	629,800	558,900	2,643,700	3,105,000
British steel ingot production (gross tons)[r]	963,000	*984,200	853,300	4,031,200	4,778,300
Non-Ferrous Metals:					
Lead production (net tons)[s]	41,551	38,073	37,358	159,477	185,197
Lead shipments (net tons)[s]	33,125	40,457	32,341	168,454	178,001
Zinc production (net tons)[t]	44,905	43,252	34,572	175,239	208,785
Zinc shipments (net tons)[t]	43,977	42,311	35,627	185,619	210,833
Deliveries of tin (gross tons)[v]	5,235	6,235	3,950	23,775	29,225

* Revised. † Three months' average.

Source of figures [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; [j] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.



Same Week Last Month	*Preceding Week*	*Last Week*		*Same Week 1935*	*Same Week 1934*	*Same Week 1933*
76.0	**79.0**	**86.0**	**COMBINED INDEX**	**50.5**	**41.5**	**59.5**
89.7	97.8	100.2	Steel Ingot Production	47.2	38.7	78.7
89.8	92.7	119.5	Automobile Production	69.2	36.8	50.3
61.4	62.3	66.1	Lumber Shipments	49.2	50.8	67.7
84.1	86.2	86.6	Pittsburgh Industrial Production	47.8	44.4	69.5
54.7	57.0	57.1	Heavy Engineering Construction	39.5	36.2	30.4

THE unprecedented rise of 6 whole points which occurred in THE IRON AGE's seasonally adjusted capital goods index last week is attributable to the automobile component. Cram's reported production for the holiday week at 100,697 units, up from the previous week's total and in striking contrast to the 69,380 assemblies of the corresponding week a year ago. Based on the fact that less working days were involved plus a contradictory seasonal movement at this time, the automobile index, after these adjustments, advanced 22 entire points. It is possible that the reporting source will find it necessary to revise downward its estimate of the week's actual output.

On this basis, however, including also good contra-seasonal strength in other series of the capital goods family, THE IRON AGE's combined index gained 6 points to a level of 85.0 per cent of typical base-period industrial conditions. This contrasts with 79.0 per cent last week, and establishes a new record peak for the year, as well as for any year since 1930. Heretofore, the third week in December, 1935, at 82.5 per cent, held this distinction. At that time, the momentum imparted to business by an unusually active fourth quarter in conjunction with sharply contrasting seasonal tendencies, succeeded in lifting the adjusted index to a high plane. Present conditions, however, bid fair to outdo all earlier occurrences. At the moment, the weekly index is more than 68 per cent higher than it was in the comparable period of 1935.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON. . . . . .

. . . With organizing activities well under way, labor spokesmen attempt to place blame for possible trouble on steel industry.

o o o

. . . Strike possibilities are minimized despite menacing attitude of John L. Lewis.

o o o

. . . Row between CIO and A. F. of L. is still unsettled.

o o o

. . . Madam Secretary Perkins slaps Steel Institute on wrist and warns it not to get "panicky."

o o o

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

o o o

WASHINGTON, July 7.—By means of many and voluminous publicity statements, nation-wide broadcasts, mass meetings and in other ways, an organized attempt is being made to convince the public that the steel industry is to blame for the labor situation with which it is confronted. . . . Obviously the appeal is not being confined simply to the workers of the nation or to any other single group. . . . It seeks a favorable and strong public sentiment, a tremendously powerful weapon. . . . Bitter attacks on steel executives, the industry and the American Iron and Steel Institute, designed to hold them up to scorn, are poured forth. . . . Dramatics, such as they are, are indulged in and the steel industry which had nothing whatsoever to do with fomenting the situation is told that it will be its fault if industrial strife develops. . . .

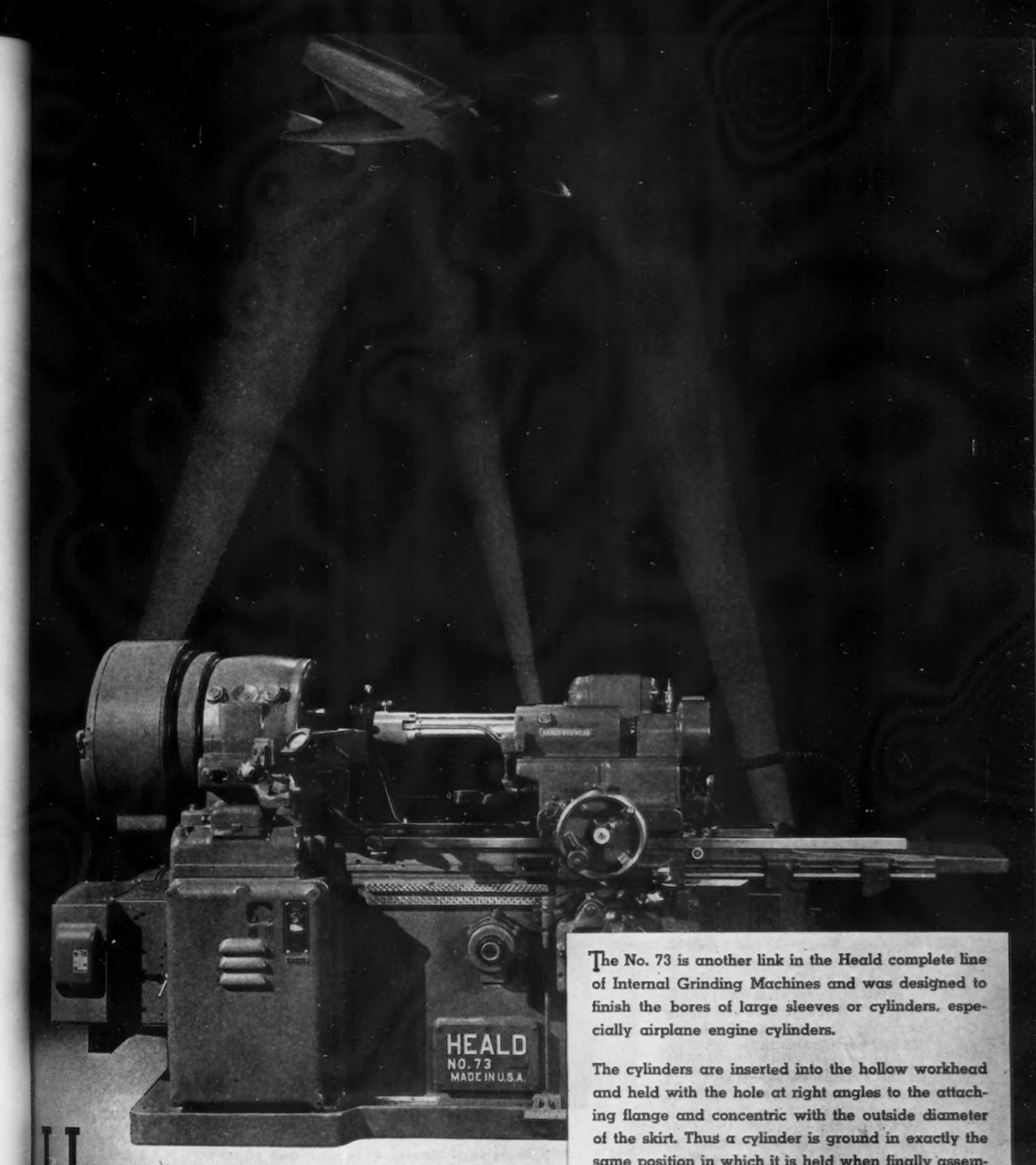
Madam Frances Perkins, Secretary of Labor, in her self-appointed role as mentor of the situation, lectured the industry and told it not to get panicky. . . . Following the lead of the Committee for Industrial Organization, headed by John L. Lewis, she criticized the American Iron and Steel Institute for its page statement in newspapers throughout the country which declared its purpose of defending the open shop against coercive efforts to unionize the industry. . . Though much milder than the bristling CIO statement issued after a meeting of the committee in Washington last Thursday, she read into the declaration of the Institute "threats" that are non-existent. . . . More fittingly she might well direct her rebukes against the professional agitators. . . .

And while Miss Perkins gravely warned the industry not to get "panicky" as she insinuated a tone of official calmness, some government sources clearly are in a nervous state over the situation. . . . It is very doubtful if some in the Administration share the position of the organized labor leaders who are promoting the drive to set up industrial unions in the steel and other mass industries . . . at least they see in the movement a genuine threat to recovery about which they talk so much and for which unjustified credit is taken. . . .

Yet if the Government should be projected into the situation, would it not find itself in an embarrassing position? . . . . Mr. Lewis has "pledged" the vote of the United Mine Workers to President Roosevelt in his campaign for reelection and the organization has recorded itself officially in support of the President. . . . Regardless of whether or not the full vote of the organization is given Mr. Roosevelt it is officially sponsoring the President's candidacy. . . . At the White House Mr. Lewis was shown and approved the labor plank of the New Deal platform prior to ratification at Philadelphia and, whether he did or did not actually have a hand in drafting the plank, it is certain it definitely reflects his views. . . .

As a member of the so-called Non-Partisan League, Mr. Lewis is also actively promoting the campaign of the President. . . . And the League, avowedly set up on a nation-wide scale to work for the reelection of Mr. Roosevelt by appealing to the labor and farm vote, is headed by a Government official, Maj. George L. Berry, "Coordinator" for Industry who seizes every opportunity that presents itself to take a fling at the steel industry, as well as other large groups which do not share his ironic idea of "coordination." . . . Or his views as to organized labor or which the "coordinator" as president of the Pressmen's Union, is a prominent figure. . . .

President William Green of the American Federation of Labor has pledged his support to President Roosevelt's candidacy and got himself in a jam by inferentially seeking to "pledge" the support of the Federation. . . . He had to do some



HEALD

Cylinder Grinding Machine for Airplane Engines

The Heald Machine Co., Worcester, Mass.

The No. 73 is another link in the Heald complete line of Internal Grinding Machines and was designed to finish the bores of large sleeves or cylinders, especially airplane engine cylinders.

The cylinders are inserted into the hollow workhead and held with the hole at right angles to the attaching flange and concentric with the outside diameter of the skirt. Thus a cylinder is ground in exactly the same position in which it is held when finally assembled for use, eliminating any chance of cramping or being out of alignment with the piston.

The No. 73 is now furnished with an extra heavy T shaped base. It is equipped with individual motors for wheelhead, workhead and pumps, all mounted on vibration dampeners. It has special plain bearings in the workhead with full pressure feed lubrication. A flexible coupling drives the wheelhead from a jackshaft, thus the entire machine with all its units is designed to eliminate vibration and give an excellent finish.

New bulletin just off the press sent on request.

fast back-tracking when Federation representatives at the Republican convention in Cleveland demanded to know by what right he had to suggest such a pledge. . . .

Major Berry, Mr. Lewis and the latter's right bower, Philip Murray, in the drive to organize the steel industry, in virtually simultaneous statements assailing the American Iron and Steel Institute went so far as to say the steel industry dictated the labor plank of the Republican platform. . . . These perfectly nonsensical blasts found their flimsy origin in the fact that the Cleveland plank guarantees labor the right to organize without interference "from any source". . . . The phrase of course does have the endorsement of the steel industry, Just as it has the endorsement of many industries, including closed shop industries. . . . It found its way into the steel and other codes. . . . It was unsuccessfully fought for by industrialists in many lines in the course of hearings on the Wagner - Connery Labor Disputes bill. . . . It was vigorously opposed by organized labor which succeeded in having written into the act the phrase "free from employer interference," adopted in the Philadelphia platform. . . . Thus labor organizers are given, while employers are denied, the right to influence workers to join an organization. . . , The act setting forth this principle, however, has been held unconstitutional a number of times by lower courts. . . .

The active movement of organized labor, or even a branch of it, to promote the campaign of Mr. Roosevelt marks the first time it has engaged in partisan politics. . . Manifestly it expects something in return. . . . Hence, under this circumstance, how could the Administration be considered neutral if it were to set itself up as a mediator or called in, in the steel labor situation? . . . Would it dare risk doing anything that might offend the leading participants in the situation in view of their activity in support of the President's candidacy? . . . Morever, Administration sources themselves have shown their hostility toward the steel industry, a recent example of which was the snarling retort on sheet piling bids of the Federal Trade Commission, ordered by the President at the behest of Secretary of the Interior Ickes and turned over by the President to the Department of Justice with recommendation for "appropriate action." . . . The attitude of Miss Perkins is far from impartial in the present situation, although it is not marked by the rancor displayed by some of her colleagues. . . .

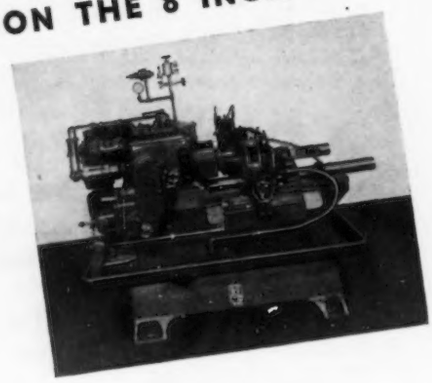
So, unpleasant as the picture is, it is clear that the steel industry has been plumped directly as an issue in the political campaign. . . . And those responsible for it are trying to shift the blame on the industry, using the American Iron and Steel Institute statement as their chief vehicle to draw the desired indictment. . . .

Moreover, the industry is represented as wanting to bring on a strike at an early date before the unionization drive has penetrated deeply. . . . Horrendous pictures of preparations at steel plants for trouble are flaunted. . . . Just how far this sort of talk can get remains to be seen. . . but it would seem incredible that any wide range of sentiment can be turned to the conception that an industry is seeking labor trouble with all its sorry implications, its effect on recovery and its breach of much-needed peace for both social and economic reasons. . . .

After the CIO meeting, Mr. Lewis said the unionization campaign would be carried on in an attempt to avoid a strike. . . . Assuredly, Mr. Lewis, more than any one else, can avoid a strike. . . . But here again, an effort was made to place responsibility upon the industry, for, he said, a strike would be "foolish, unnecessary and unjustifiable unless the steel corporations provoke it." . . . And as mem-

TURNING SPRING CAGES

ON THE 8 INCH FAY



8" FAY AUTOMATIC LATHE

We illustrate, on these pages, a typical 8" Fay Automatic Lathe job—a job where the greatest possible speed plus the greatest possible accuracy are essential. The 8" Fay meets both of these requirements.

The work, a brass spring cage, comes to the machine as a rough forging. Mounted on an air operated collet fixture and turned at

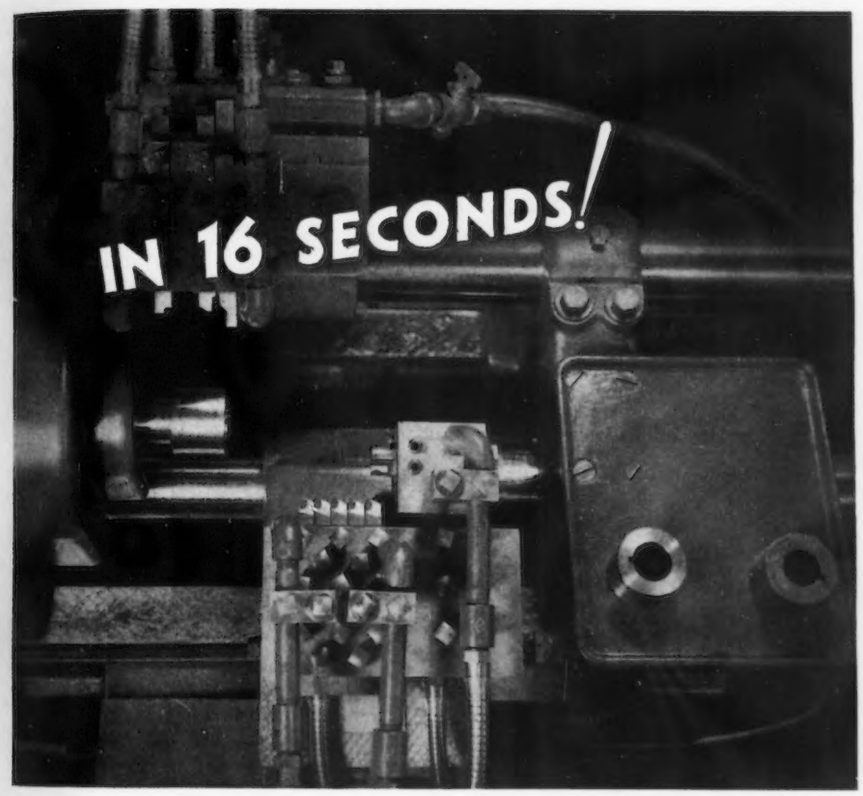
JONES & LAMSON MACHINE

bers of the committee were leaving for their various headquarters, he urged them to "let nothing stop you" in their attempt to organize the industry. . . . "If the steel industry insists on a fight we have no alternative but to meet them." . . . A peculiar mixture of peace and belligerent talk. . . . How really belligerent was not indicated. . . . A gesture, intended for effect, was the characterization given the statement that as the campaign progresses the committee will ask the American Iron and Steel Institute for a conference to work out the labor problem of the industry "in accordance with the rules of modern collective bargaining." . . . Refusal of the Institute to grant a conference, it was indicated, will be capitalized or an attempt will be made to capitalize it, as proof of the industry's "obstinacy" and unfairness to organized labor. . . . Or, as said in one report, published in papers friendly to organized labor, the move is "an effort to place responsibility for hostilities squarely upon mill owners."

Knowing that if a really large strike does develop and is of any considerable duration that the $500,000 which the CIO has pledged will be soon exhausted, the CIO said in its statement that "Arrangements were consummated to provide the organizing forces with adequate financial assistances, legal protection and necessary facilities of every character." . . . It has been said by some of the leaders that, if necessary, popular appeal to the public would be made to raise funds. . . . Whether this is seriously in mind, it is decidedly the general view that such an attempt would be wholly without any success. . . . There is also a view that even if the CIO actually goes to the length of a strike, either small or large, it would hesitate doing so prior to the Presidential election for fear of its adverse effect on the candidacy of Mr. Roosevelt. . . .

However, it may be pointed out that there is abroad a philosophy along reverse lines. . . . That a strike would arouse resentment, not against the labor organizers, but against the industry and turn votes in the President's favor, is a most dubious view. . . . And, again, some believe that one reason a strike will be averted is because of lack of funds unless strikers could be put on Federal relief. . . The ambitious campaign of attempted industrial unionization has been extended to the automobile, rubber and textile industries, unions of the first and second industries having just joined up with the other 10 unions of CIO. . . . If there were general strikes, or even sizable strikes, growing out of this movement, it has been asked, would not unfavorable reaction against the movement be so strong as to scotch it? . . . General strikes never have succeeded and when attempted have brought public condemnation. . . . Are these moves only professional gestures? . . . Certainly there is another worry for the CIO. . . This is the lack of solidarity or organized labor forces. . . . Mr. Lewis has viciously attacked President Green for not joining in the industrial unionization move, for sticking by the Federation craft union policy, and has scorned the demand of the executive council of the Federation that the CIO disband. . . . And Mr. Lewis and other CIO representatives have declined the invitation Council for the CIO members to appear before it to answer charges of seeking to organize a rival faction. . . . But aside from all these elements it is of course realized that once passions are aroused the seed for trouble has been planted. . .

In commenting on the steel labor situation, Miss Perkins affected the belief that there will be no strike. . . . While cautioning the steel industry not to become "panicky," perhaps a gratuitous warning, she also assured the public there was no reason for "bated breath" and there are those who think that barring hob-head action, she had good reason for saying so. . . . She pro-



CLOSE-UP OF TOOLING ON 8" FAY TURNING SPRING CAGE

1160 R.P.M., a floor to floor time of 16 seconds is obtained, giving a production of 179 pieces per hour.

But let's have a look at the operations performed in these 16 seconds. The carriage turns the O.D.; bores and chamfers the 1-½" hole; takes two cuts over the two bearing surfaces, and one cut over the relieved portion. Meanwhile the back arm faces and chamfers both ends and removes the stock in one end of the relieved portion. By combining these operations, the Fay is able to cut down on floor space, labor, upkeep, and initial investment on turning equipment.

Send in drawings for estimates; there is no obligation, of course. The 8", 12", 20", and 24" Fay Automatics can earn profits for YOU on YOUR turning jobs.

CO., - Springfield, Vermont, U. S. A.

ceeded to state that the organization drive does not necessarily mean that strikes will result and added that the Department of Labor has sent out adequate forces of observers to keep in touch with the situation. . . . Admonishing that "this is not a strike" when asked if the Department were making plans to avert trouble, Miss Perkins said that "this is a movement to extend an existing labor organization. There is no reason, it seems to me, for panic. It is not necessary to have a strike in order to organize." . . .

There are those who will think Miss Perkins placed herself in the position in which she placed steel employers, when, commenting on the Institute statement, she said that the employers were several steps ahead of any possible program, as the labor forces had not announced that it was their purpose to call a strike. . . . She was particularly critical of the paragraph in the Institute statement that "there are many disturbing indications that the promoters of the campaign will employ coercion and intimidation of the employees in the industry and foment strikes." . . . Miss Perkins declared that "these assumptions are based on facts not yet available." . . .

Such are some of the many factors in the steel labor situation with an outstanding challenge to meet the strong attempt to arouse a favorable public sentiment and not merely a favorable labor sentiment for the industrial unionists and against the steel and other industries which, under present-day philosophy, have committed the sin of growing big. . . . Such is the CIO's "educational" campaign. . . .

▼ ▼ ▼

Practice Recommendation on Hack-Saw Blades Issued

The committee in charge of Simplified Practice Recommendation R90-29, hack-saw blades, has approved a revision of the recommendation, and the Division of Simplified Practice of the Bureau of Standards has mailed copies to all interests for consideration and approval. The current recommendation, which became effective July 1, 1929, covers length, width, thickness, and number of teeth an in. of tungsten and carbon steel and high-speed blades, hand and power sizes. The proposed revision lists the length, width, thickness, number of teeth an in., and other dimensions of tungsten alloy steel blades, double hardened blades, high speed steel blades, and special alloy blades—all hard, hand and power sizes.

Survey Shows Executives Get 3 Per Cent Of Payrolls

The popular belief that a large percentage of the nation's industrial payroll goes to a handful of top executives was shown to be false by the results of a survey made public today by the National Association of Manufacturers covering 694 companies in 25 leading industries. Executive salaries, including bonuses, comprised, on the basis of this survey, but 3 per cent of the total payroll of American industry, 0.6 per cent of sales, and 13c. for each share of common stock. Taxes, on the other hand, took 34 per cent of payrolls.

Commenting on the results of the study, the association said, "actually, executive salaries range from about one third of the total payroll, in small businesses employing from 1 to 25 persons, to 1 per cent of the total payroll, in large businesses employing more than 5000 workers. For the nearly 700 companies covered by the study, the average was but 3 per cent of the total payroll. Compared with the tax burden weighing down on these same companies, executive salaries dwindle into insignificance. Taxes take more than 11 times the amount paid in executive salaries. While 3 per cent of the total payroll goes for such salaries, taxes equal 34 per cent, or more than one third, of the total payroll of this cross-section of American industry.

. . . Russian machinery trade revived.

o o

. . . German ship-builders active.

o o

. . . National iron mines to supply 50 per cent of requirements.

HAMBURG, June 25 (*by special correspondence*).—Machinery trade with Russia, which has been abandoned for some time, has been resumed chiefly on a barter basis. The largest transaction of this type was the sale to a German concern of the entire properties of the Derunapht, an oil company, including pumps, refineries, fleets of vehicles, tanks, etc., and an annual contract for the supply of large quantities of oil and gasoline. Payment will be made in steel tubes and machinery.

Most of this trade in machines consists of imports from Russia of German-made machines of comparatively recent production which could not be repaired or were giving unsatisfactory service. German merchants have the machines repaired by the original makers and resell to Russia or other markets.

The German steel tube cartel is prepared to enter an international cartel if the present export figures, which are 80 to 110 per cent higher than those of 1935, may be accepted as a basis for international negotiation.

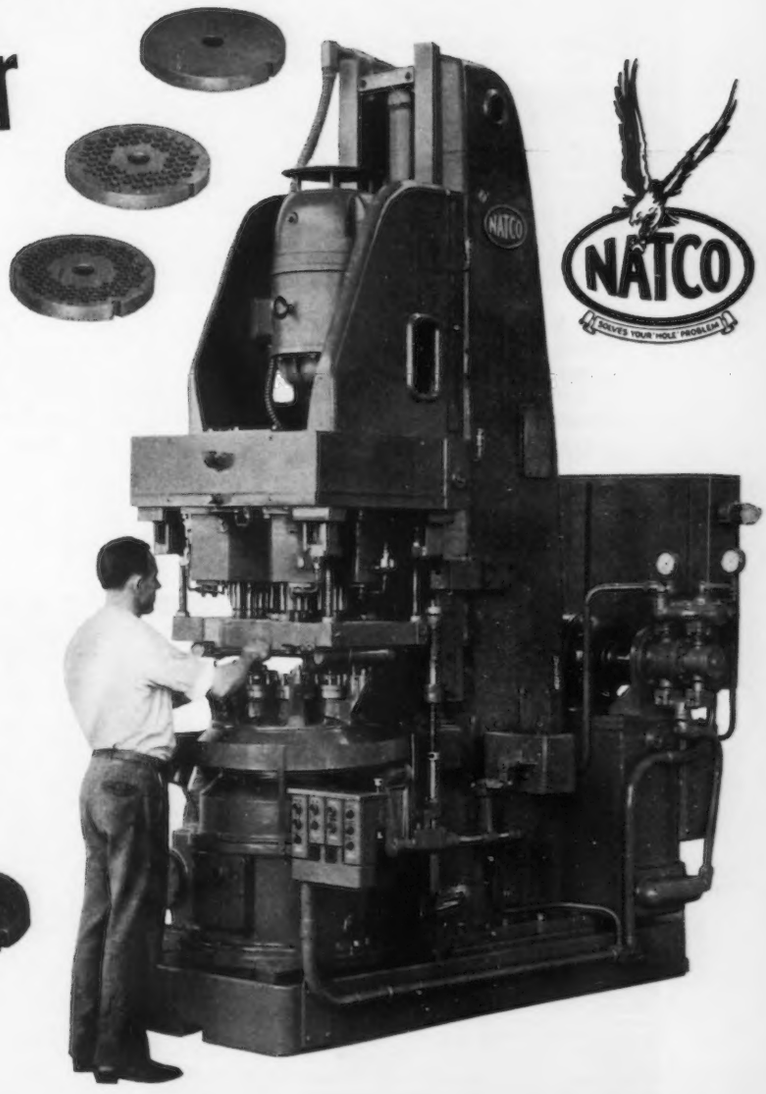
Export trade in machinery is showing another improvement and the number employed in that industry increased by several thousand in May and June. The industry is operating at about 77½ per cent of capacity. Export turnover in machine tools is nearly 80 per cent more than at this time last year.

The Ford Motor Co. works in Cologne is building a new factory where motors, heretofore imported, will be manufactured.

In spite of the general quietness which rules on the export market, the German industry is maintaining a high turnover, which is based chiefly on compensation and barter transactions. Orders have been turned down for semi-finished steel and tubes, and the demand for plates, particularly ship plates, is very good. The influx of orders to shipyards is still continuing and demand on the domestic market remains very strong.

It was revealed at the recent assembly of the Federation of German Metallurgists that the steel industry will conform with the demand of the German Ministry of Industry to use domestic supplies for at least 50 per cent of iron consumption. The Treaty of Versailles deprived Germany of her Lorraine and Upper-Silesian iron mines, making her dependent to a great extent upon imports for her iron. Due, however, to years of

50 to 75 Meat Chopper Plates are Drilled Per Hour



• The NATCO Vertical Hydraulic Driller shown at the right is being used by a prominent manufacturer of food preparing machines to drill a number of different sized meat chopper plates. The material in these plates, which are also shown, ranges from mild steel to stainless steel and the number of holes drilled varies from 16 to 354 holes. The production varies from 50 to 75 plates per hour.

• This NATCO is arranged with a cluster box containing 6 drivers for driving 6 auxiliary flower pot type heads. These heads are interchangeable and different heads are used for drilling the various plates.

• The "chopper plates" are held in 7 single small indexing fixtures which are in turn mounted on a 22" diameter 7 position automatic indexing table. As the "chopper plates" progress from station to station, the required number of holes are drilled.

• Yes, we believe this is a good example of NATCO Engineering . . . another example of a NATCO designed and built for a specific multiple drilling job.

This NATCO was Engineered For a Specific Multiple Drilling Job

• Reduced costs mean increased profits. Now it's the business of NATCO Engineers to study your drilling, boring and tapping problems . . . and suggest equipment which will cut your costs to an absolute minimum. Without any sort of obligation we will make a careful survey and lay our recommendations before you . . . then you be the judge. Send in your prints or call a NATCO representative today.

• Chicago Office, 2009 Engineering Building, 205 West Wacker Drive; Detroit Office, 409 New Center Building. Factory and Home Offices,

The National Automatic Tool Company, Richmond, Indiana, U. S. A.

NATCO
SOLVES YOUR HOLE PROBLEM

NATCO Drilling, Boring, and Tapping Equipment

uninterrupted research it is now possible to use low grade iron ores which are abundant in Germany and which previously were considered unsuitable for smelting except at prohibitive cost without an increase in price or a decrease in quality. In spite of a much greater consumption it will be possible to supply the required amount of iron from national mines as early as 1938.

Mesta Machine Co., West Homestead, Pa., has granted a week's vacation with pay this year to more than 1000 hourly employees where length of service has been five years or more.

Acquires New Plant For Small Motors

BECAUSE of the necessity for expanding the production facilities of its Springfield, Mass., works in merchandising lines, particularly refrigeration and air conditioning units, the Westinghouse Electric & Mfg. Co. is transferring the manufacture of small motors now produced at its Springfield plant to Lima, Ohio, where the company has acquired a plant formerly owned by the Relay Motors Corp. Machinery required for the manufacture of small motors will be installed immediately and it is expected that motor production may be started in the new factory by the first of the year. The plant will be under the direction of R. F. Frenger, manager of the small motor division of the company.

In addition to a 50 per cent increase in motor production facilities, Westinghouse officials state that the new location will provide the advantage of being closer to

R. F. FRENGER

the large Middle-West market for small motors and also of being nearer the source of much of the raw material required.

The buildings at Lima are of single story construction and will provide about 300,000 sq. ft. of floor space. All Westinghouse motors for washing machines, ironers, refrigerators, vacuum cleaners and other home appliances will be produced in the new factory. The rehabilitation program will involve the installation of new machine tool equipment, electric wiring for individual drive, and the modernization of lighting equipment.

The American Rolling Mill Co. is completing negotiations for the acquisition of a 50 per cent interest of the Koppers Gas & Coke Co. in the Hamilton Coke & Iron Co. At the present time the Hamilton company is owned jointly by the American Rolling Mill Co. and the Koppers Co. subsidiary. It is understood that the deal involves $4,000,000.

Exchange of Inland Steel Co.'s stock, through which it will acquire the Milcor Steel Co., Milwaukee, was to be completed about July 1. Milcor stockholders will receive 59,000 shares of Inland stock for their 89,693 present shares.

THE No. 16 Blanchard with magnetic chuck 26″ or 30″ diameter is applicable to a wide range of production work and also to die and tool work.

Blanchard Grinding should be considered for any unobstructed flat surface, requiring better finish or accuracy than would result from a roughing cut.

Send samples or blueprints of your work for conservative time estimates.

BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE STREET · CAMBRIDGE · MASS.

Management Association Names New Officers

JAMES O. McKINSEY, chairman, Marshall Field & Co., Chicago, was chosen chairman of the board of the American Management Association at the annual meeting held recently in New York. As its new president, the association chose Alvin E. Dodd who for the last two years has been its chief executive officer with the title of executive vice-president.

Mr. McKinsey became chairman of Marshall Field & Co. in 1935. Since 1925 he has been senior partner in the engineering firm of James O. McKinsey & Co., Chicago, now McKinsey, Wellington & Co. He has been a pioneer in the use of the budget as a means of control and as a useful aid to management in controlling business operations. He has served leading business organizations as a consultant on personnel, marketing, merchandising, organization, and other management problems. In his new responsibilities with A. M. A. he takes the place of Sam A. Lewisohn, vice-president, Miami Copper Company, New York, who retires from the chairmanship of the A. M. A. Board after serving several terms.

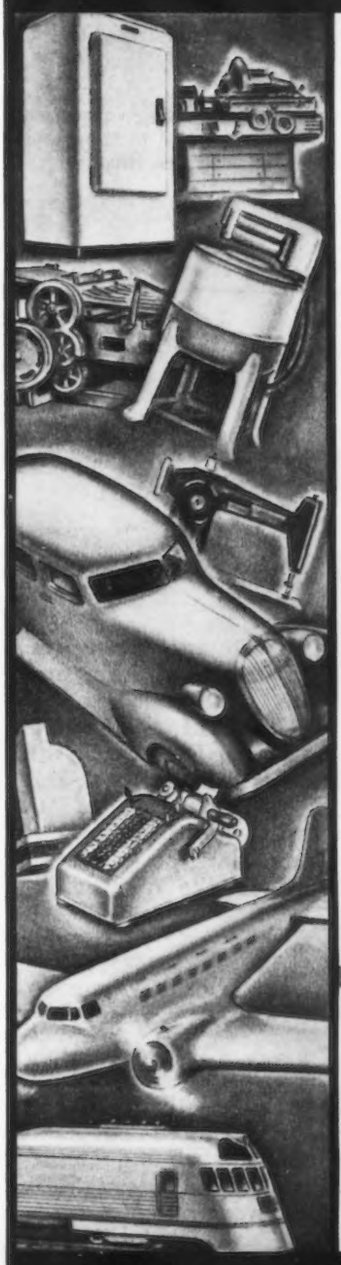
As first manager of the distribution department of the United States Chamber of Commerce, Mr. Dodd acted as personal advisor to many business men; directed the 1932 national distribution conference; and began the eleven-city experimental census of retail and wholesale trade which resulted in the national census of distribution. Later he was first director general of the Wholesale Dry Goods Institute. He then entered the chain store field being called to Chicago to assume direction of the expanding retail activities of Sears, Roebuck & Co. and later becoming vice-president, Kroger Grocery & Baking Co.

Arthur H. Young, vice-president in charge of industrial relations, United States Steel Corp., New York, continues as chairman of the executive committee of the association.

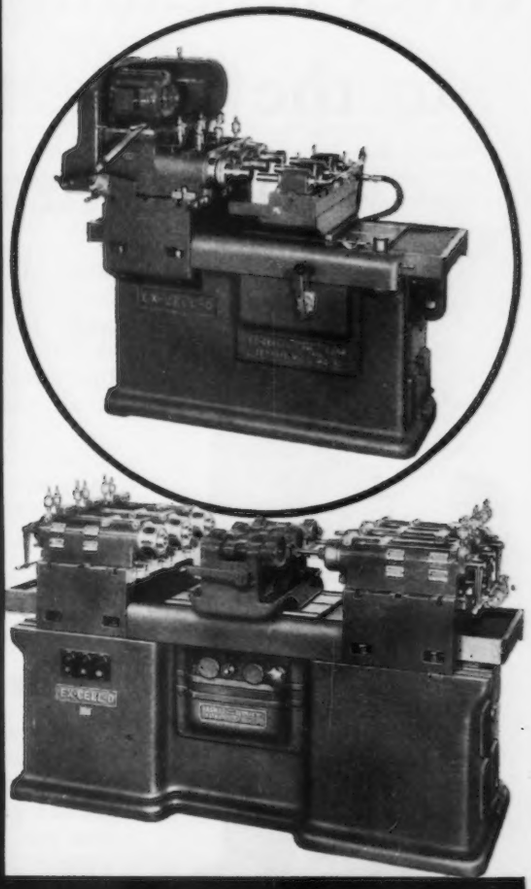
Enamel Building Is Exposition Feature

DISTINGUISHED by its colorful beauty and by its exhibition of advanced materials, the Enamel Building will be an important point of interest during the

There is an
XLO Precision Boring Machine
to meet Production Requirements of Every Industry



5 sizes of XLO Precision Boring Machines (single and double end) provide a machine specifically suited to the requirements of boring, turning, and facing operations. The "Senior" Series is illustrated. Complete information will be furnished upon request.



EX-CELL-O
AIRCRAFT & TOOL **CORPORATION** DETROIT, MICHIGAN

100 days of Cleveland's $25,000,000 Great Lakes Exposition which opens June 27 along a mile of Lake Erie's shore.

The building itself is constructed of Haskelite which consists of precut sections of plywood backed on one side by metal and on the other by porcelain enameled metal, thus combining the wearing qualities of metal and porcelain enamel with the insulating values of wood. Construction of the building represents the first occasion in which this material has been used for complete outside wall coverage.

Displays are replete with exhibits of well known, nationally advertised products made entirely or partly of porcelain enamel. Refrigerators, sinks, cooking ware, plumbing fixtures, tables tops and numerous other articles will demonstrate how household articles have been made more useful, more beautiful and more permanent with fused-glass (porcelain enamel) surfaces.

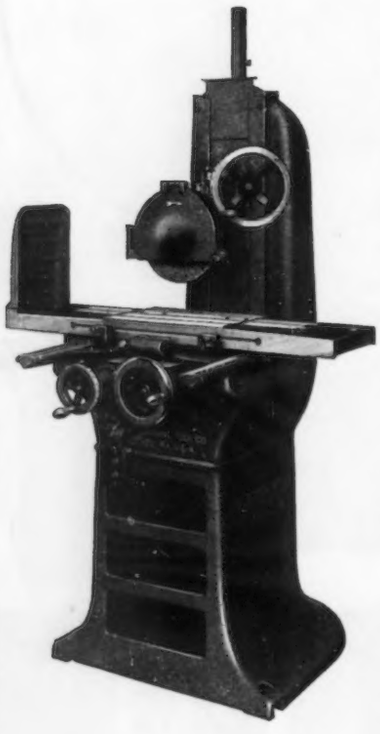
The important uses of this product in industrial fields likewise is shown in the exhibits. Large sections from tanks lined with porcelain to protect the contents from deterioration and to preserve the tank metal from chemical action of the contents are displayed among industrial exhibits.

Porcelain enameling processes will be brought home to thousands of exposition visitors through the use of a porcelain enameling furnace where visitors may write their names on souvenirs and have them fired while they watch.

The advantage of porcelain enameled fixtures in retail marketing is displayed in a model grocery store made partly of these enameled fixtures and partly of wood.

The building was constructed by Ferro Enamel Corp. of Cleveland in cooperation with American Rolling Mill Co., Benjamin Electric Mfg. Co., Toledo Porcelain Enamel Products Co., Davidson Enamel Products Co., Erie Enameling Co., C. G. Hussey & Co., Haskelite Mfg. Co. and B. F. Drakenfeld & Co., Inc.

Gives a beautiful finish—to the highest degree of accuracy



Tool Makers who are responsible for the finer types of flat, form, and gage grinding will welcome the superior qualities of this hand-operated machine. Because of the small number of moving parts and the skillful proportioning of its metal, vibration has been practically eliminated and the quality of work produced is the highest obtainable.

The New Abrasive No. 1½ Surface Grinder

takes work up to 15"x10"x12", and all feeds are operated by hand wheels of ample size and convenient location. Careful investigation has not only proved that a large proportion of toolroom jobs going into small surface grinders, do not require automatic feeds, but that in most cases the work can be done much faster with this hand feed machine.

ABRASIVE MACHINE TOOL CO.

E. Providence, R. I.

Brazilian Iron Mine At High Elevation

ABOUT 4000 ft. above sea level, on the slopes of a mountain in Minas Geraes, Brazil, is a large deposit of hematite iron ore. For years the high-grade ores in this district have been mentioned in discussions of the world's reserves, and developments on a large scale have been planned but not carried through.

Now, however, the "Casa de Pedra" mine is producing ore averaging over 67 per cent metallic Fe., and shipping to Canada, Germany and England. Two cargoes have been delivered at Philadelphia.

On a level area between two peaks a town has been built, with stores, school, athletic fields, to care for the laborers, of which more than 1000 are employed at present. Steam shovels and machinery have not displaced many picks and shovels in Brazil.

A hydro-electric plant supplies power to operate the air compressors, crushers, etc. From the mine bins an aerial cableway runs through forests down the mountain nearly 3 miles to storage bins, which discharge into cars on the Central Railroad of Brazil siding. Then the ore travels south to steamers at the docks in Rio de Janeiro, where it is loaded at the rate of 1000 tons or more per day.

Nearby are manganese mines producing ores of various grades, from manganiferous with 7 to 9 per cent manganese content and 50 per cent iron, up to standard 48 per cent manganese ore suitable for making ferromanganese. The mines are operated by A. Thun & Cia., Ltda., the largest independent shippers of Brazilian ores, for whom Tomlinson & Co., Philadelphia, are agents.

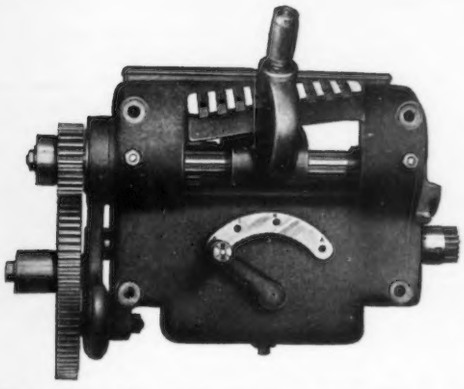
Battelle Sets Up New Research Associate Plan

THE trustees of Battelle Memorial Institute, Columbus, Ohio, have announced a new plan to extend the scope and utility of the educational features of the institute's basic program of scientific research. Since its inception, the policy of Battelle Memorial Institute has been to combine a program of fundamental research of general interest to industry with the applied research which it has carried on for individual companies and associations under its plan of sponsored research.

A new division of research associates has been established to supplement the work in fundamental science of the regular technical staff. The purpose of this new division is to offer intensive training in practical research to the best of the younger workers in selected branches of chemistry, metallurgy, fuels and ceramics. Appointments as research associate will be made for one year's duration and may be extended for a second year. A research associate will be expected to devote his entire time to a research problem approved by the director and supervised by members of the institute staff. The results of these researches will be published in order to contribute information that will be useful to science and industry.

Appointments as research associate are open to graduates of any accredited university or college, but preference will be shown to men who have demonstrated a marked aptitude for scientific research in their industrial experience or through one or more year's graduate study. The appointment will carry an annual salary of from $1,200 to $1,800 depending on the training and experience of the individual. Four appointments as Battelle research associate will be made for the year 1936-1937. Applications for appointment may be obtained from the director of the institute.

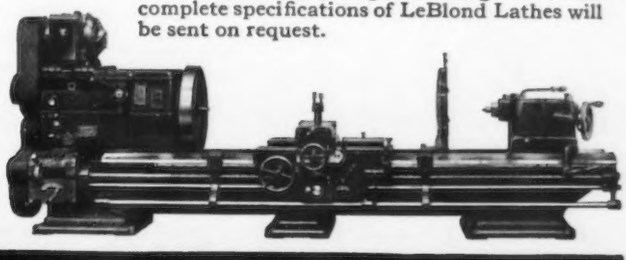
LE BLOND LATHES
give every shop many sharp Production Economies



THE acid test of any equipment is performance. This quality is inherent in every LeBlond Lathe, the result of a half century devotion to the ideals of superior design and extra value.

In every feature of the LeBlond lathe Performance is self evident. The Feed Box, for instance. It is of extra heavy design with a range of feeds for all requirements without the use of pick off gears. A cone of gears, an intermediate shaft on anti-friction bearings and a set of sliding gears are housed in a one piece casting. Tumbler gear is held in positive engagement with cone gears by means of plunger in shifter handle. This insures smooth drive to lead screw, thus producing accurate threads and smooth cutting.

FREE BROCHURE giving interesting details and complete specifications of LeBlond Lathes will be sent on request.



LE BLOND

The R. K. LE BLOND MACHINE TOOL CO., CINCINNATI, O.
HALF CENTURY OF SERVICE TO INDUSTRY

New Company Will Make Carbide Tools

THE Reeder Carbide Tool Co., 356 East Congress Street, Detroit, has been formed to handle the sale and manufacture of tungsten carbide and high-speed steel tools. E. R. F. Reeder, who for the past seven years has been district sales manager for the middle west states for Thomas Prosser & Son, is general manager of the concern.

L. N. Hall, prominently identified with sales of tungsten carbide tools in Detroit, Cleveland and Chicago for the past eight years, is district manager of sales of the new company. David Hall and Carl Zwar, who have been identified with the manufacture of fine tools, will continue to make in their own shop tools for the Reeder company. Oren S. Cole has been named sales engineer and will handle all service contacts.

New Departure Honors Employees

AT the Endee Inn, Bristol, Conn., July 1, 252 of the older employees of the New Departure Division of General Motors Corp. sat down to a dinner given by the company in their honor. It was brought out in remarks by the management that the combined service records of those present totaled 6000 years and commented on the significance of this accumulated experience and its profound effect on the success of New Departure and the industrial world, and the welfare and happiness of the residents of Meriden and Bristol.

100 days of Cleveland's $25,000,000 Great Lakes Exposition which opens June 27 along a mile of Lake Erie's shore.

The building itself is constructed of Haskelite which consists of precut sections of plywood backed on one side by metal and on the other by porcelain enameled metal, thus combining the wearing qualities of metal and porcelain enamel with the insulating values of wood. Construction of the building represents the first occasion in which this material has been used for complete outside wall coverage.

Displays are replete with exhibits of well known, nationally advertised products made entirely or partly of porcelain enamel. Refrigerators, sinks, cooking ware, plumbing fixtures, tables tops and numerous other articles will demonstrate how household articles have been made more useful, more beautiful and more permanent with fused-glass (porcelain enamel) surfaces.

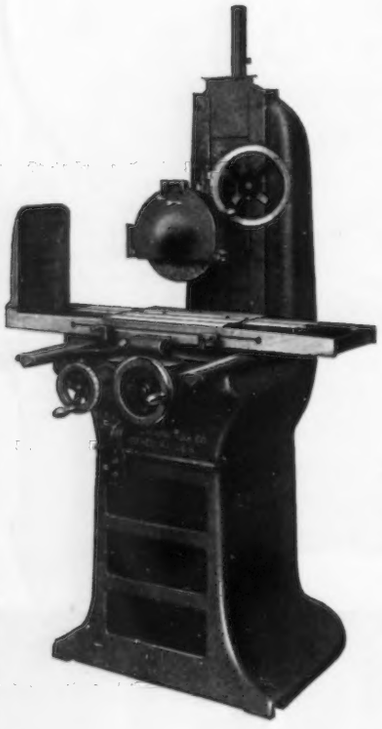
The important uses of this product in industrial fields likewise is shown in the exhibits. Large sections from tanks lined with porcelain to protect the contents from deterioration and to preserve the tank metal from chemical action of the contents are displayed among industrial exhibits.

Porcelain enameling processes will be brought home to thousands of exposition visitors through the use of a porcelain enameling furnace where visitors may write their names on souvenirs and have them fired while they watch.

The advantage of porcelain enameled fixtures in retail marketing is displayed in a model grocery store made partly of these enameled fixtures and partly of wood.

The building was constructed by Ferro Enamel Corp. of Cleveland in cooperation with American Rolling Mill Co., Benjamin Electric Mfg. Co., Toledo Porcelain Enamel Products Co., Davidson Enamel Products Co., Erie Enameling Co., C. G. Hussey & Co., Haskelite Mfg. Co. and B. F. Drakenfeld & Co., Inc.

Gives a beautiful finish—to the highest degree of accuracy



Tool Makers who are responsible for the finer types of flat, form, and gage grinding will welcome the superior qualities of this hand-operated machine. Because of the small number of moving parts and the skillful proportioning of its metal, vibration has been practically eliminated and the quality of work produced is the highest obtainable.

The New Abrasive No. 1½ Surface Grinder

takes work up to 15″x10″x12″, and all feeds are operated by hand wheels of ample size and convenient location. Careful investigation has not only proved that a large proportion of toolroom jobs going into small surface grinders, do not require automatic feeds, but that in most cases the work can be done much faster with this hand feed machine.

ABRASIVE MACHINE TOOL CO.

E. Providence, R. I.

Brazilian Iron Mine At High Elevation

ABOUT 4000 ft. above sea level, on the slopes of a mountain in Minas Geraes, Brazil, is a large deposit of hematite iron ore. For years the high-grade ores in this district have been mentioned in discussions of the world's reserves, and developments on a large scale have been planned but not carried through.

Now, however, the "Casa de Pedra" mine is producing ore averaging over 67 per cent metallic Fe., and shipping to Canada, Germany and England. Two cargoes have been delivered at Philadelphia.

On a level area between two peaks a town has been built, with stores, school, athletic fields, to care for the laborers, of which more than 1000 are employed at present. Steam shovels and machinery have not displaced many picks and shovels in Brazil.

A hydro-electric plant supplies power to operate the air compressors, crushers, etc. From the mine bins an aerial cableway runs through forests down the mountain nearly 3 miles to storage bins, which discharge into cars on the Central Railroad of Brazil siding. Then the ore travels south to steamers at the docks in Rio de Janeiro, where it is loaded at the rate of 1000 tons or more per day.

Nearby are manganese mines producing ores of various grades, from manganiferous with 7 to 9 per cent manganese content and 50 per cent iron, up to standard 48 per cent manganese ore suitable for making ferromanganese. The mines are operated by A. Thun & Cia., Ltda., the largest independent shippers of Brazilian ores, for whom Tomlinson & Co., Philadelphia, are agents.

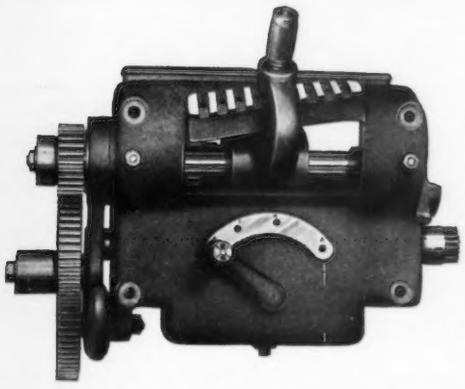
Battelle Sets Up New Research Associate Plan

THE trustees of Battelle Memorial Institute, Columbus, Ohio, have announced a new plan to extend the scope and utility of the educational features of the institute's basic program of scientific research. Since its inception, the policy of Battelle Memorial Institute has been to combine a program of fundamental research of general interest to industry with the applied research which it has carried on for individual companies and associations under its plan of sponsored research.

A new division of research associates has been established to supplement the work in fundamental science of the regular technical staff. The purpose of this new division is to offer intensive training in practical research to the best of the younger workers in selected branches of chemistry, metallurgy, fuels and ceramics. Appointments as research associate will be made for one year's duration and may be extended for a second year. A research associate will be expected to devote his entire time to a research problem approved by the director and supervised by members of the institute staff. The results of these researches will be published in order to contribute information that will be useful to science and industry.

Appointments as research associate are open to graduates of any accredited university or college, but preference will be shown to men who have demonstrated a marked aptitude for scientific research in their industrial experience or through one or more year's graduate study. The appointment will carry an annual salary of from $1,200 to $1,800 depending on the training and experience of the individual. Four appointments as Battelle research associate will be made for the year 1936-1937. Applications for appointment may be obtained from the director of the institute.

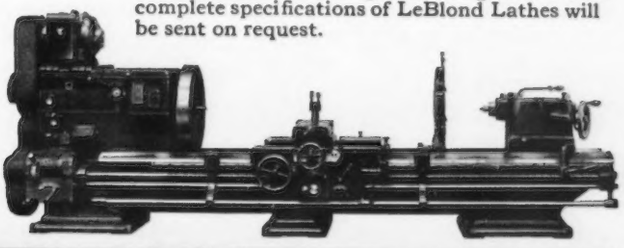
LE BLOND LATHES
give every shop many sharp
Production Economies



THE acid test of any equipment is performance. This quality is inherent in every LeBlond Lathe, the result of a half century devotion to the ideals of superior design and extra value.

In every feature of the LeBlond lathe Performance is self evident. The Feed Box, for instance. It is of extra heavy design with a range of feeds for all requirements without the use of pick off gears. A cone of gears, an intermediate shaft on anti-friction bearings and a set of sliding gears are housed in a one piece casting. Tumbler gear is held in positive engagement with cone gears by means of plunger in shifter handle. This insures smooth drive to lead screw, thus producing accurate threads and smooth cutting.

FREE BROCHURE giving interesting details and complete specifications of LeBlond Lathes will be sent on request.



LE BLOND

The R. K. LE BLOND MACHINE TOOL CO., CINCINNATI, O.
HALF CENTURY OF SERVICE TO INDUSTRY

New Company Will Make Carbide Tools

THE Reeder Carbide Tool Co., 356 East Congress Street, Detroit, has been formed to handle the sale and manufacture of tungsten carbide and high-speed steel tools. E. R. F. Reeder, who for the past seven years has been district sales manager for the middle west states for Thomas Prosser & Son, is general manager of the concern.

L. N. Hall, prominently identified with sales of tungsten carbide tools in Detroit, Cleveland and Chicago for the past eight years, is district manager of sales of the new company. David Hall and Carl Zwar, who have been identified with the manufacture of fine tools, will continue to make in their own shop tools for the Reeder company. Oren S. Cole has been named sales engineer and will handle all service contacts.

New Departure Honors Employees

AT the Endee Inn, Bristol, Conn., July 1, 252 of the older employees of the New Departure Division of General Motors Corp. sat down to a dinner given by the company in their honor. It was brought out in remarks by the management that the combined service records of those present totaled 6000 years and commented on the significance of this accumulated experience and its profound effect on the success of New Departure and the industrial world, and the welfare and happiness of the residents of Meriden and Bristol.

Steel Imports Increase 7 Per Cent—Exports Down Slightly

Imports (In Gross Tons)	May		Five Months Ended May	
	1936	1935	1936	1935
Pig iron	15,296	23,174	80,714	46,903
Sponge iron	....	50	1,128	462
Ferromanganese[1]	2,623	4,633	9,795	18,375
Speigeleisen	4,589	....	12,089	....
Ferrochrome[2]	....	....	1	1
Ferrosilicon[3]	67	25	375	377
Other ferroalloys[4]	1	....	1	1
Scrap	15,695	823	46,512	9,639
Pig iron, ferroalloys and scrap	*38,271*	*28,705*	*150,615*	*75,758*
Steel ingots, blooms, etc.	....	34	61	1,004
Billets, whether solid or hollow[5]	78	....	310	....
Wire rods	1,690	1,750	8,492	6,452
Semi-finished steel	*1,768*	*1,784*	*8,863*	*7,456*
Concrete reinforcement bars	682	190	1,208	508
Hollow steel bars	192	92	846	405
Merchant steel bars	3,805	2,737	16,531	9,427
Iron slabs	....	....	....	....
Iron bars	67	48	490	317
Boiler and other plate	....	....	52	73
Sheets, skelp and saw plate	1,523	622	9,117	2,696
Die blocks or blanks, etc.[5]	1	....	89	....
Tin plate	38	17	127	100
Structural shapes	4,946	3,686	22,270	13,087
Sheet piling	88	....	864	....
Rails and track material	402	379	2,973	1,459
Welded pipe	395	175	2,226	554
Other pipe	937	1,337	7,163	4,942
Hoops and bands for baling	....	1,474	88	1,743
Other hoops and bands	2,373	2,276	9,937	8,557
Barbed wire	1,069	1,900	8,662	11,012
Round iron and steel wire	480	388	1,916	1,696
Telegraph and telephone wire	....	6	32	13
Flat wire and steel strips	261	134	1,204	706
Wire rope and strand	163	98	1,046	797
Other wire	85	57	639	397
Nails, tacks and staples	1,595	1,441	11,324	6,950
Bolts, nuts and rivets	80	37	219	142
Horse and mule shoes	44	61	167	318
Rolled and finished steel	*19,226*	*17,155*	*99,190*	*65,899*
Malleable iron pipe fittings	3	....	20	46
Cast iron pipe and fittings	47	....	109	....
Castings and forgings	76	75	438	496
Total	59,391	47,719	259,235	149,655

[1] Manganese Content. [2] Chrome Content. [3] Silicon Content. [4] Alloy Content. [5] New classes. No comparable figures for previous years.

Exports (In Gross Tons)	May		Five Months Ended May	
	1936	1935	1936	1935
Pig iron	121	248	833	1,004
Ferromanganese and spiegeleisen	60	1	210	34
Other ferroalloys[5]	156	....	966	....
Iron and steel scrap	213,366	215,513	863,577	906,932
Tin plate scrap	....	3,221	8,825	16,194
Waste-waste tin plate	4,073	2,215	13,360	10,060
Pig iron, ferroalloys and scrap	*217,776*	*221,198*	*887,771*	*934,224*
Ingots, blooms, billets, sheet bars	982	1,675	5,201	26,502
Skelp	5,188	2,724	12,345	6,236
Wire rods	3,183	1,150	17,614	8,794
Semi-finished steel	*9,353*	*5,549*	*35,160*	*41,532*
Bars, concrete reinforcement[5]	377	....	1,153	....
Bars, other steel	5,114	4,528	21,308	23,304
Iron bars	108	124	549	561
Plates, iron and steel	6,360	2,961	26,758	16,199
Sheets, galvanized steel	4,830	7,445	23,766	31,481
Sheets, galvanized iron	219	111	571	624
Sheets, black steel	10,106	9,363	55,016	43,659
Sheets, black iron	605	653	3,097	2,552
Hoops, bands, strip steel	4,169	3,508	23,383	18,159
Tin plate and taggers' tin	25,889	7,349	105,110	46,952
Terne plate (including long terne)	373	175	1,469	1,196
Structural shapes, plain material	3,166	2,699	19,516	12,395
Structural material, fabricated	1,641	2,011	8,293	9,838
Sheet piling[5]	257	....	1,277	....
Tanks, steel	1,428	413	11,099	2,538
Steel rails	4,440	2,117	25,947	12,564
Rail fastenings, switches, spikes, etc.	1,123	544	4,532	3,786
Boiler tubes	478	1,404	2,568	4,451
Casing and oil line pipe	1,417	1,165	8,677	15,147
Pipe, black and galvanized, welded steel	1,457	2,158	8,046	17,247
Pipe, black and galvanized, welded iron	271	253	1,352	1,628
Plain wire	4,772	3,055	18,559	14,312
Barbed wire and woven wire fencing	3,395	2,122	13,758	12,866
Wire cloth and screening	79	83	412	395
Wire rope	283	296	1,453	1,794
Wire nails	786	688	3,554	4,227
Other nails and tacks	316	274	1,401	1,532
Other wire and manufactures	326	364	1,955	2,126
Bolts, nuts, rivets and washers, except track	621	595	2,631	2,840
Other finished steel	187	154	817	583
Rolled and finished steel	*84,593*	*56,612*	*398,027*	*304,956*
Cast iron pipe and fittings	1,325	1,346	5,736	6,160
Malleable iron screwed fittings	339	287	1,324	1,345
Carwheels and axles	594	380	2,328	10,910
Iron castings	342	697	3,074	3,706
Steel castings	213	161	1,141	1,105
Forgings	415	369	2,079	2,416
Castings and forgings	*3,228*	*3,240*	*15,682*	*25,642*
Total	314,950	286,599	1,336,640	1,306,354

IRON and steel imports during May, with the exception of scrap, followed a slightly upward curve and aggregated 43,696 tons valued at $1,766,599, thereby registering gains of 7.2 per cent and 4.1 per cent respectively over April receipts. The increase in pig iron receipts in itself was sufficient to alter the trend, 3,314 additional tons being imported. Other sizeable increases were in ferromanganese (952 tons), bars, whether solid or hollow (504 tons) and concrete reinforcing bars (480 tons). Rails and track materials recorded the outstanding decrease when receipts fell 1,318 tons short of those which came in during April. Other outstanding declines were noticed in nails, tacks and staples, sheets, skelp and sawplate, other hoops, barbed wire and sponge iron.

An increased iron and scrap import trade resulted in May when receipts reached 15,695 tons, thereby rising 84 per cent when compared with April. This figure is also sharply above that for May, 1935, when only 823 tons were taken into this country.

May exports of iron and steel products with the exception of scrap decreased 7.2 per cent as compared with April. However, the 97,511 tons which was shipped abroad represented a 48.5 per cent increase over the figures for May, 1935.

May Imports of Iron and Manganese Ores

(In Gross Tons)

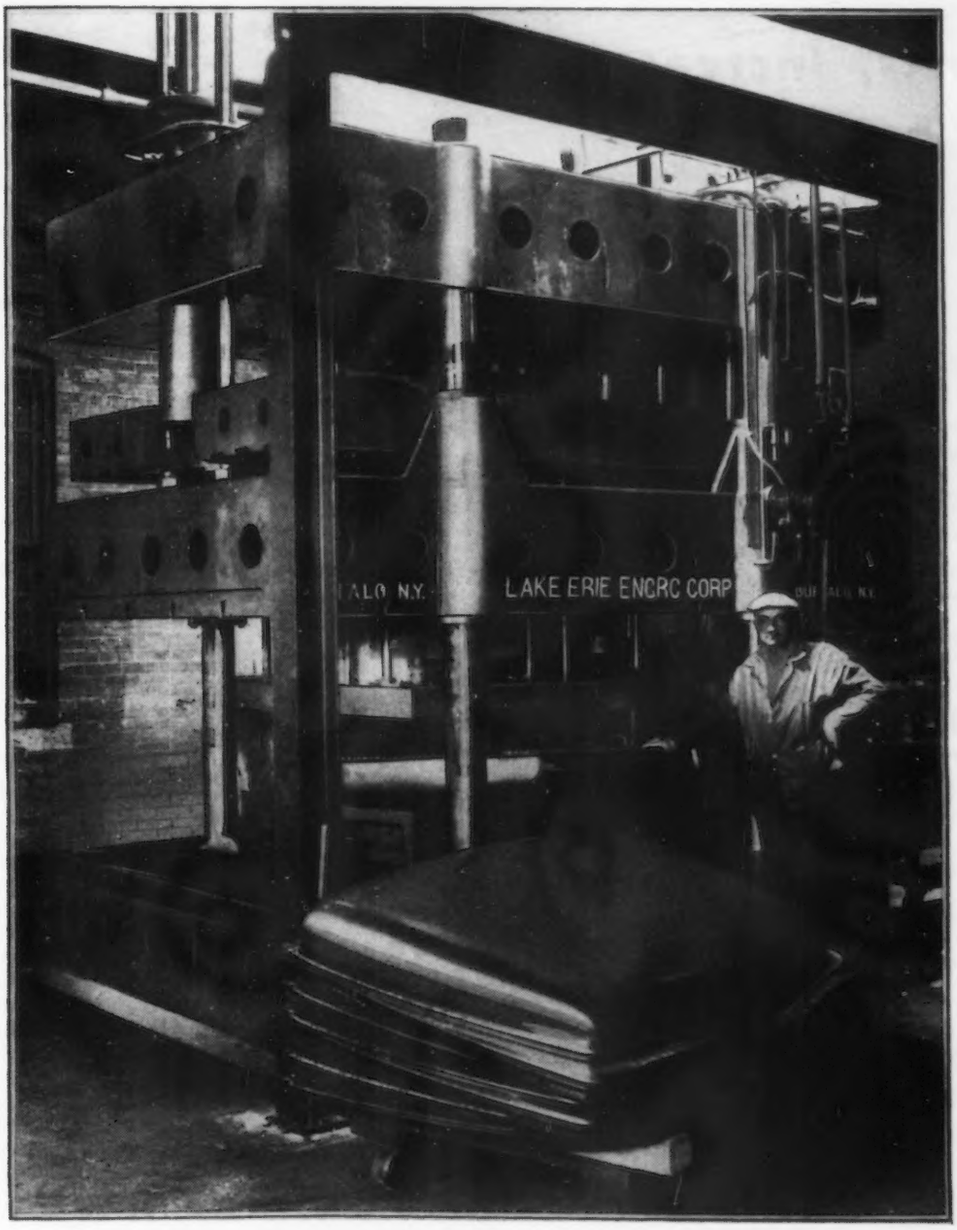
	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1936	1935	1936	1935
Canada	41	....	....	....
Cuba	55,500	44,500	2,079	....
Chile	....	22,350	....	....
Spain	....	11	....	....
Norway	23,687	24,398	....	....
Sweden	....	....	....	....
French Africa	6,043	....	....	....
Russia	....	....	17,075	8,873
India	....	....	9,611	557
Brazil	....	....	....	....
West Africa	....	....	8,784	2,573
Other Countries*	113,949	17,206	53	204
Total	199,220	108,465	37,602	12,207

*Includes 110,450 from Colombia.

May Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	May		Five Months Ended May	
	1936	1935	1936	1935
United Kingdom	100	10,101	1,182	10,301
British India	4,361	2,743	22,318	8,543
Germany	666	....	3,361	....
Netherlands	5,913	7,361	34,991	17,401
Canada	2,911	486	5,104	5,221
France	....	....	....	50
Belgium	....	....	529	100
Norway	200	....	1,258	1,610
Sweden	....	....	164	340
Russia	1,145	....	11,607	....
All Others	....	2,483	200	3,337
Total	15.296	23.174	80.714	46.903



Large Stampings At Low Cost

A high speed autobody forming press as used by a large truck manufacturer to form full size body panels as well as cab doors and tops. Very inexpensive open ring dies and laminated hardwood punches are utilized.

This press has a capacity of 250 tons with bed 72″ x 130″ arranged with blank holder for clamping sheet. Self-contained with motor pump having pressing and clamping pressures quickly adjustable to suit work.

A press of this type but double the capacity is now being built for a leading aircraft manufacturer.

Write us for further details on how to reduce the cost of your stampings.

LAKE ERIE ENGINEERING CORPORATION

68 Kenmore Station, Buffalo, N. Y.

Cut Costs, Increase Production

Our largest type Drilling Machine shown above. Has hydraulic feed, automatic operating cycle. Powerful, rigid, efficient.

DRILLING—You can cut many costs and increase production on much drilling, from ½" to 4" diameter, by using Self-Oiling, All-Geared Drilling Machines. These are made in many sizes of single-spindle and gang types, also in specially designed High Production Units. Investigate!

HONING—We build a complete line of Internal Honing Machines for finishing cylinders of any size and diameter that can be honed. Advantages of the process, and Self-Oiling Hydraulic Internal Honing Machines, are described in Bulletin No. 121-B which is in our complete catalog.

Write Today for Catalog I

One of our single spindle Honers. We make larger and smaller sizes, also multiple spindle types.

Barnes Drill Co., 815 Chestnut St., Rockford, Illinois, U. S. A.

Testing Society Starts New Year at Atlantic City

(CONTINUED FROM PAGE 65)

entation and Recrystallization," by John T. Norton, Massachusetts Institute of Technology; "The X-Ray Determination of Particle Size," by G. Harvey Cameron, Hamilton College, and A. L. Patterson, Massachusetts Institute of Technology; and "The Application of the X-Ray Diffraction Method to Non-Metallic Materials," by George L. Clark, University of Illinois.

Testing and Fatigue of Metals

In the Wednesday sessions dealing with testing of metals, fatigue, and spectrographic analysis, Wilbur M. Wilson, University of Illinois, described applications of the wedge extensometer. As its name suggests, the wedge extensometer is an instrument in which the properties of the wedge are used as a means of multiplying a very small change in distance between two points, thereby making possible a more accurate measurement of the change. It was pointed out that when the instrument is used by a skilled operator it is both reliable and sensitive. It is limited in its field of application, but, fortunately, can be used in situations to which other extensometers are not adaptable. Mr. Wilson described several specific applications of the instrument as employed by himself and by assistants working under his direction.

Another paper in this group dealt with high-velocity tension-impact tests, and was presented by H. C. Mann, Dudley Medalist, and senior materials engineer, Watertown Arsenal. This paper contained data which definitely showed that high-velocity tests are essential to reveal the true dynamic properties of materials. The results obtained further indicate that in the selection of materials for use under conditions involving dynamic loading, the following three significant factors must be considered: (1) The transition velocity within which normal behavior may be expected, (2) the ratio of total energy value to mass or volume of material involved, (3) the effect of surface irregularities such as tool marks, size and form of fillets, etc. The high-velocity tension-impact machine designed and built for this investigation was described, and the mathematical derivation of the equation used to calculate the energy required for rupture was given. In addition, diagrams and photographs of typical transitions were presented, which showed the effect of velocity on both ferrous and non-ferrous materials.

Another paper in this same group was entitled "Damage and Overstress in the Fatigue of Ferrous Materials," presented by H. W. Russell and W. A. Welcker, Jr., Battelle Memorial Institute. These two investigators conducted fatigue studies with 12 ferrous materials covering a wide range of structure and properties. These studies include the stress-cycle curve to high stresses of conventional polished specimens and of specimens with a

square notch. The damage produced by overstressing for a number of cycles insufficient to cause fracture was investigated with both polished and notched specimens.

It was found that it is possible to establish with some definiteness a zone on the stress-cycle diagram, above the endurance limit, and bounded by a "damage line" within which no damage is done to the specimen, as indicated by its ability to run subsequently at the endurance limit for an indefinite number of cycles. A 0.35 per cent carbon steel showed almost no resistance to overstress, while notched specimens of wrought iron were remarkably resistant to damage by overstress, the damage line almost coinciding with the stress-cycle curve. The investigators attempted to find some correlation between the high stress fatigue properties and the results of tensile and impact tests. However, no clear-cut relations were found, although some insight into the mechanism of notch formation and notch propagation was secured.

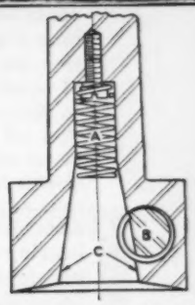
Non-Ferrous Metals

In the non-ferrous metals sessions, Peter R. Kosting of the Watertown Arsenal gave an interesting paper entitled "Stress-Relief Annealing of High-Strength Monel Metal Plate." The data presented dealt with the effect of temperature of annealing and time at temperature upon the tensile properties of high-strength monel metal plate ½ in. in thickness. Plates from four heats were studied. All plates were hot-rolled, but finished at a low temperature, except some plates from one heat which were cold-rolled 10 per cent. Extensometers of 0.0002 and 0.00002-in. sensitivity were used for determining yield strength, 0.00 per cent set. All plates showed maximum increase in yield strength, 0.00 per cent set, in the temperature range 1020 to 1110 deg. F. Yield strengths at higher per cent sets reached maximum values at lower temperatures. The greater the effect of cold work, the lower was the annealing temperature at which maximum values were obtained. The value of the yield strength, 0.00 per cent set, was appreciably affected by internal strains. It was apparent that this monel plate must be heated to 1020 to 1110 deg. F. to be stress-relieved.

A paper describing the forming properties of some non-ferrous sheet metals was presented by G. R. Gohn, Bell Telephone Laboratories, Inc. This paper was a continuation of an investigation which was first undertaken several years ago by Western Electric Co. to obtain information relative to the forming of 90-deg. bends in various non-ferrous metals. The previous paper (1931) described a method whereby such forming data might be obtained, and it contained tabulations of minimum safe forming radii for three alloys of brass and two alloys each of nickel silver and phosphor bronze. This information proved so valuable in the design and manufacture of telephone apparatus that the investigation was extended, as described in the present paper. Additional forming data were presented on the seven alloys previously studied as well as data on other non-ferrous sheet metals. The method used in determining the minimum safe forming radius was described and the data so obtained were tabulated.

W. A. Gibson and J. H. Doss, Revere Copper & Brass Co., Inc., presented data on the effect of iron impurities on the annealing of high brass. This paper gave the effect of iron impurities on the annealing of high brass for temperatures from 600 to 1200 deg. F. and for iron impurities from 0.008 to 0.287 per cent. The investigation paid

GRIPS POSITIVELY . . .
RELEASES EASILY . . .
—it's the BROWN & SHARPE "CAM LOCK"—the Modern end mill drive that saves time and money—and sets new production standards.



A Spring keeps End Mill floating and insures correct seating.

B Cam lock insures positive drive. Draws mill securely into taper—locks it there.

C Milling Machine Standard Taper insures quick release.

Locked and Released with the turn of a wrench.

BROWN & SHARPE "CAM LOCK" CUTTER ADAPTERS
Patented

Ask for Catalog 32
Brown & Sharpe Mfg. Co.
Providence, R. I.
U.S.A.

particular attention to the effect of annealing at temperatures from 800 to 900 deg. F., and for iron impurities below 0.10 per cent. The effect of time on the annealing of brass was also considered. This paper differed from previous published information in that detailed attention was paid to the lower iron contents and to the lower annealing temperatures. Due to this attention, information is brought out which is not noticeable with less-detailed data.

In this same session on non-ferrous metals, John N. Kenyon, Columbia University, reported on the effect of the addition of lead on the endurance limit of a certain tin-base bearing alloy. This investigation was in reality a continuation of work started several years ago to determine the effect of the addition of lead on certain tin-antimony-copper babbitt metals. It was shown that the addition of 4 per cent of lead has little effect on the endurance properties of a tin-base bearing alloy (80 per cent tin, 15 per cent antimony, 5 per cent cent copper), and that if lead has any effect, it is to improve the material. It was also discovered that a peculiar form of bearing failure occurs after the alloy has been in service a long time, and some explanation for this failure is offered.

All the committee reports and papers dealing with corrosion, effect of temperature, and creep testing were presented Wednesday morning. In this group of papers, Albert J. Phillips, American Smelting & Refining Co., reported on a group of creep tests on lead and lead alloys. These data were for tests of three years' duration, and it was definitely shown that it is unsafe to extrapolate creep rates calculated from short-time tests. Many alloying elements which increase the tensile strength of lead decrease the resistance to creep under low loads. Copper added to lead improves the creep resistance very markedly. Antimony lowers the creep resistance except in the age-hardened condition where elongation under fairly high tensile loads is practically nil. However, such metal will fracture without flow under sustained loads, making it difficult, if not impossible, to calculate a safe working stress. It was found also that tin lowers the creep resistance without serious loss in ductility. Tellurium added to lead lowers its creep resistance under low loads in both the hard-rolled and annealed condition.

In this same session, A. E. White and C. L. Clark, University of Michigan, and R. L. Wilson, Timken Steel & Tube Co., reported on the influence of time at 1000 deg. F. on the characteristics of carbon steel. The paper described extended-time creep tests at 1000 deg. F. on an annealed electric furnace 0.15 per cent carbon steel. The stresses were so selected that rupture of the specimens occurred after different intervals of time in the series of tests, and fractures were actually obtained in periods up to 14,000 hr. The complete time-elongation curves were thus available, permitting the arrangement of the results to show the influence of time of test on the reported creep stresses.

The investigation revealed that carbon steel loses considerable ductility after prolonged heating under stress at 1000 deg. F., and, on the basis of a metallographic examination, an explanation was offered for this behavior.

Evidence was also presented to show that (1) the type of fracture varies depending on whether the temperature of test is above or below the lowest temperature of recrystallization, (2) spheroidization will occur in plain carbon steel under stress at 1000 deg. F., and (3) remanent strain-hardening is manifested in this steel at 1000 deg. F. only when the time for rupture is short, as in the short-time tension test.

Space limitations preclude the presentation of short descriptions of the many other interesting papers presented at the 1936 annual A.S.T.M. convention. Suffice to say, the many committee reports brought forth much valuable data, and many of the unmentioned formal papers will be found of considerable use to both the steel and non-ferrous industries. Copies of all these papers may be secured from the A.S.T.M., at Philadelphia.

English Importer to Buy Materials Here

P. DONALD, managing director, Rownson, Drew & Clydesdale, Ltd., London, now visiting this country, wishes to get in touch with building materials and equipment manufacturers interested in export sales.

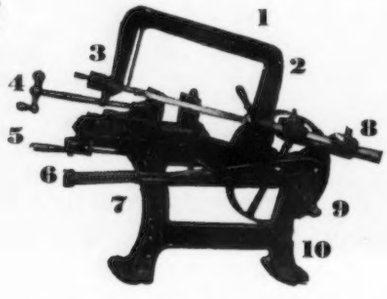
He would like to hear from manufacturers of such products as nails and screws, copper pipe, bending machines, doors, gas tubing, galvanized troughing, cast iron soil pipe, stainless steel sinks, flushing cisterns, refrigerators, sanitary earthenware, geysers, shower fittings, sanitary brasswork and enameled pressed steel work.

Mr. Donald also acts for the Associated Builders' Merchants, Ltd., London, and is chairman of the Iron and Steel and Metal Merchants Section and the Import and Export Merchants' Section of the London Chamber of Commerce.

He will be at the Commodore Hotel, New York, until July 10.

Count up features and you'll count out all competing Hack Saws

Check over the features of the MARVEL Motor and you'll see why 80% of the dry cutting general purpose hack Saws in use are MARVELS.



Heavier, sturdier construction with (1) Heavy Rigid Frame, (2) V-Bearing with Screw Take-up, (3) Adjustable Blade Tension, (4) Swivel Vise, (5) Automatic Stop, (6) Feed Pressure Adjustment, (7) All-Front Control, (8) Adjustable Stroke, (9) Stationary or Portable, Belt or Motor Driven Models, (10) Low Price: No. 1 Capacity 6" x 6" $42.00; No. 2 Capacity 8" x 8" $72.00.

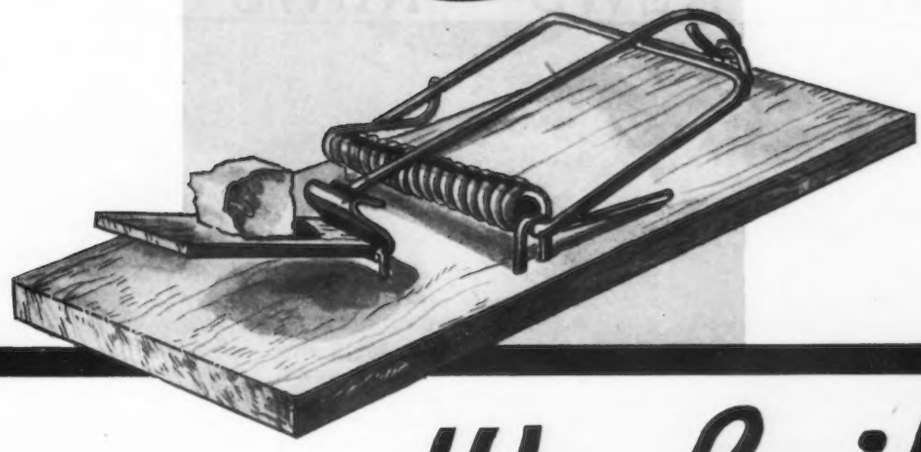
Write for Catalog and Bulletins

MARVEL
No. 1 and 2
Hack Saws

The MARVEL Line embodies Heavy Duty High Speed Saws, Production Sawing machines, with automatic bar push-up. A metal Cutting Band Saw and a giant Hydraulic Hack Saw that handles the largest sizes and toughest alloys.

MARVEL
ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
349 N. Francisco Ave., CHICAGO, U.S.A.

"If you preach a better sermon or build a better mouse-trap than your neighbor, tho you build your house in the woods, the world will make a beaten path to your door."



....We Build BETTER MOUSETRAPS!

Which is just another way of saying that our stampings have established a reputation in the pressed steel field.

This "better mouse-trap" reputation has been built on the ability of T and W engineers to work out intricate stampings—plus the facilities of our plant to support their designs and specifications with precision and uniform production.

Transue and Williams welcome the opportunity to point out with figures and blueprints the economy, strength, weight and machining advantages that pressed steel offers the concern releasing a new product or redesigning an old one. Write the nearest sales office.

Transue & Williams Alliance, Ohio

Sales Offices: New York . Philadelphia . Chicago . Detroit . Indianapolis . Cleveland

TRANSUE & WILLIAMS

Designers and Makers of

DEEP DRAWN STAMPINGS

---NEWS----NEWS----NEWS----NEWS---

Steel Companies Meet Unionization Drive with Statement of Position

OUTSTANDING events in the drive to unionize steel workers this week have included a statement from B. F. Fairless, president of the Carnegie-Illinois Steel Corp. to all employees, a resolution from the employee representatives of the Clairton plant of the Carnegie-Illinois Steel Corp. and several statements from leaders in the Steel Workers' Organizing Committee.

Mr. Fairless' statement which follows, was the first of its kind to be made directly to employees:

"During the next few weeks or months you may expect to be approached by organizers, appointed and paid by 'outside' unions, who have no real interest in you or in the steel industry, and urged to join an industrial union. Mass meetings are already being held and every possible means employed to stampede you into joining the union.

"You will decide whether your best interests lie in joining the union, paying dues and imposing upon yourself the 'closed shop' and the necessity of asking the union for permission to work, or whether you will be loyal to the employee representation plan, which affords an ideal method of collective cooperation, and has proved of real benefit to you and your fellow-workmen during the past three years.

"Your company assures you that it intends to maintain the 'open shop' wherein all employees will have a fair chance to work and gain deserved promotion, and your company will do everything in its power to protect you and to maintain our existing friendly relations.

"The next number of the *United States Steel News* will carry a statement by President Irvin of the United States Steel Corp. It deserves your most careful attention. Read it and think it over."

Steel Companies Accused

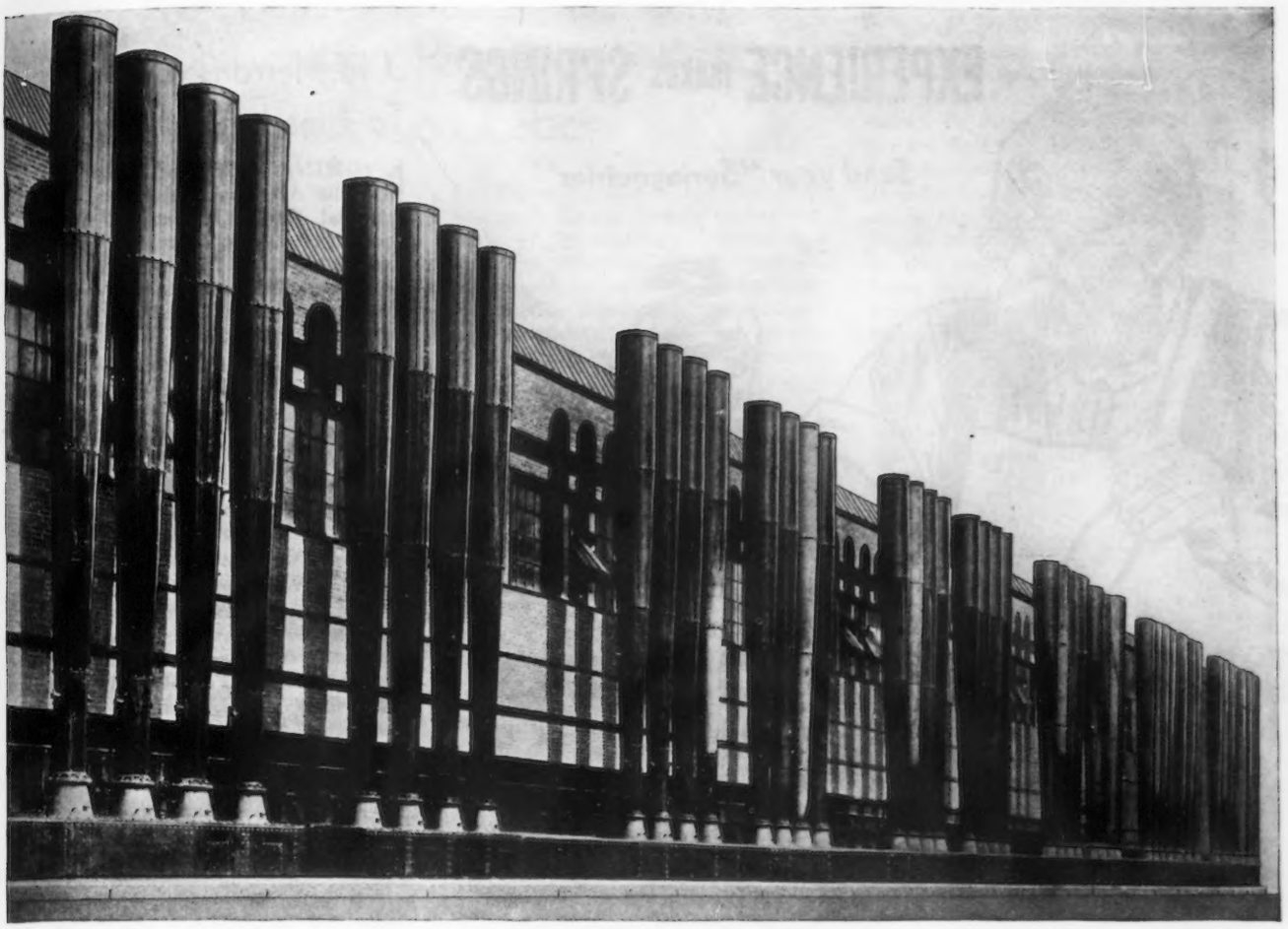
Late last week employee representatives at the Clairton plant of the Carnegie-Illinois Steel Corp. presented a resolution in which was stated the confidence in the employee representation plan of negotiating differences between management and workers. The representatives also signified their intention to work against the activities of an outside organization.

Close on the heels of these announcements came the accusation by a leader in the SWOC that some steel companies were dismissing employees for their organization activities. In the statement made by this official no definite facts or figures were presented.

Meanwhile, the SWOC has established additional sub-headquarters in various steel centers of the northeastern district. Organizers and headquarters, in addition to those mentioned last week, are as follows: Johnstown, Pa., A. B. Martin and B. Askey; Ambridge, Pa., comprising Ambridge, Beaver, Economy, Midland, Aliquippa and the Beaver Valley, Joseph Timko; New Castle, Pa., including Sharon, Farrell and Elwood City, Harold Ruttenberg; Brackenridge, Pa., including the Allegheny River Valley, Paul Fuller; Monessen, Pa., including Donora, Charleroi and Allenport, John Mayo; Steubenville, Ohio, including Weirton, Wheeling

NEWS AND MARKET INDEX

Personals	99	Obituary	101
Summary of the Week	104	Non-ferrous Market	117
Weekly Steel Ingot Production	105	Fabricated Steel	118
Pittsburgh Market	106	June Pig Iron Production	119
Comparison of Prices	107	Scrap Market and Prices	120
Chicago Market	109	Finished Iron & Steel Prices	122-123
Cleveland Market	111	Warehouse Steel Prices	124-125
New York Market	113	Pig Iron & Raw Material Prices	126
Philadelphia Market	115	Machine Tool Activity	129
		Plant Expansion & Equipment	130

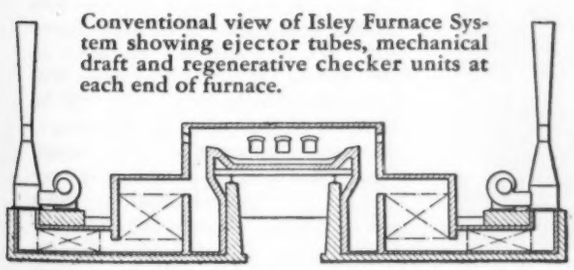


HEAT CONTROL . . .
with every GOOD *feature*

Pit furnace capacity and proper heating of ingots will grow in importance as new large mills become really busy. The soaking pit is often the bottle neck which determines the speed and uniformity of operation—and profits—of an entire mill.

Furnaces arranged for and operated by the Isley System have proved to be the most satisfactory units for the heating of steel; for high fuel economy; and for greatest flexibility to suit the most variable schedule. They are unbeatable where cold blast furnace gas is the only fuel available.

Isley Furnace Systems offer new refinements for pit installations such as balanced regulation, automatic reversing and complete instrumentation to aid the operator.



Conventional view of Isley Furnace System showing ejector tubes, mechanical draft and regenerative checker units at each end of furnace.

MORGAN CONSTRUCTION COMPANY
Worcester, Massachusetts, U. S. A.

For: Melting Furnaces * Reheating Furnaces * Annealing Furnaces * Patenting Furnaces * Normalizing Furnaces—OF THE METAL, GLASS AND CERAMIC INDUSTRIES USING ALL TYPES OF FUEL.

V2

ISLEY *Furnace* MORGAN WORCESTER ENGINEERS AND MANUFACTURERS *System*

EXPERIENCE makes SPRINGS

Send your "Springquiries" to

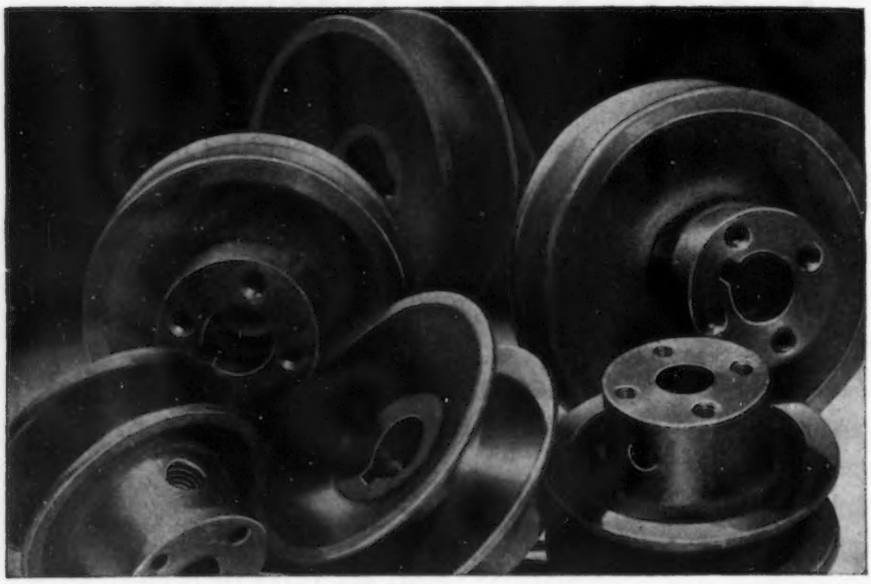
Quality Springs since 1845

DUNBAR BROS. CO.
BRISTOL CONNECTICUT

and Follansbee, W. Va., Walter J. Payne and Claude Kramer.

These organizers have been instructed to develop local leadership in the mills with the view to drafting local steel workers into the organizing service. It is reported that such recruits will be paid $6 a day.

One noticeable feature during this drive is the conspicuous absence of any mention of the Amalgamated Association of Iron, Steel and Tin Workers. While they have two members on the committee, the Amalgamated is in the minority and the SWOC has taken complete charge of the campaign.



If it's V-Belt Cast Iron Sheaves—we are specially tooled to produce any quantity up to 18" diameter at prices that will surprise you.—Write us your requirements.
LINDERME MACHINE & TOOL COMPANY, 12251 Coyle Avenue, Detroit, Michigan

J. H. Herron Nominated To Head A.S.M.E.

NOMINATIONS for officers of the American Society of Mechanical Engineers for 1937 were announced at the recent semi-annual meeting of the society, held at Dallas, Texas. Election will be by letter ballot of the entire membership.

The nominees are: President, J. H. Herron, president, James H. Herron Co., Cleveland; Vice-Presidents, J. A. Hall, professor of mechanical engineering Brown University, Providence; J. M. Todd, consulting engineer, New Orleans; and R. J. S. Pigott, staff engineer, Gulf Research & Development Corp., Pittsburgh.

Nominations for members of the Council to serve as managers were: E. W. Burbank, manager, Dallas District, Allis-Chalmers Mfg. Co.; K. H. Condit, editor, *American Machinist;* and S. W. Dudley, dean of engineering, Yale University.

Mr. Herron's company is engaged in general consultation, and inspection and testing of materials and structures, in connection with which chemical, metallurgical and research laboratories are maintained. Mr. Herron is credited with the invention of the air-compressor inlet valve unloader and of other devices for air compressors and metallurgical furnaces.

The society will hold its 1937 annual meeting at Detroit.

Electrochemical Society to Convene

THE fall meeting of the Electrochemical Society, Inc., will be held at the Hotel General Brock, Niagara Falls, Ont., Oct. 7 to 10. The Niagara Falls section of the society will act as host during the convention which will feature two special symposia. Thursday morning, Oct. 8, will be devoted to "What the Electric Furnace Has Done for Civilization" and will be directed by Frank J. Vosburgh, National Carbon Co. On Saturday, Oct. 10, A. J. Wager will preside at the second session which will discuss "Power for Electric Furnaces." The usual electrodeposition session will be Friday morning, Oct. 9, at which time special attention will be given to bright zinc. Dr. Colin G. Fink, Columbia University, New York, is secretary of the society.

Steel Corporation President States Company's Policy on Labor

IN the July issue of the *US Steel News*, William A. Irvin, president, United States Steel Corp., set forth the broad policy of the corporation with regard to labor. "The United States Steel Corp. has always stood for the open shop and will continue to do so," said Mr. Irvin. "It will never require employees to belong to any union in order to gain employment. On the contrary, it will defend their right to work, free from outside interference and coercion."

Mr. Irvin asserted that the steel corporation is convinced that these are sound American principles which have been determining factors in raising American industry and labor to a higher level than exists in any other country in the world. "We feel that these principles have the endorsement of the great majority of the American workers and we intend vigorously to defend them," the statement added.

Mr. Irvin amplified the general principles laid down in the formal statement of the American Iron and Steel Institute last week. The latter was published in response to the recent announcement by union organizers outside the steel industry of an attempt to unionize the 500,000 employees in the steel industry.

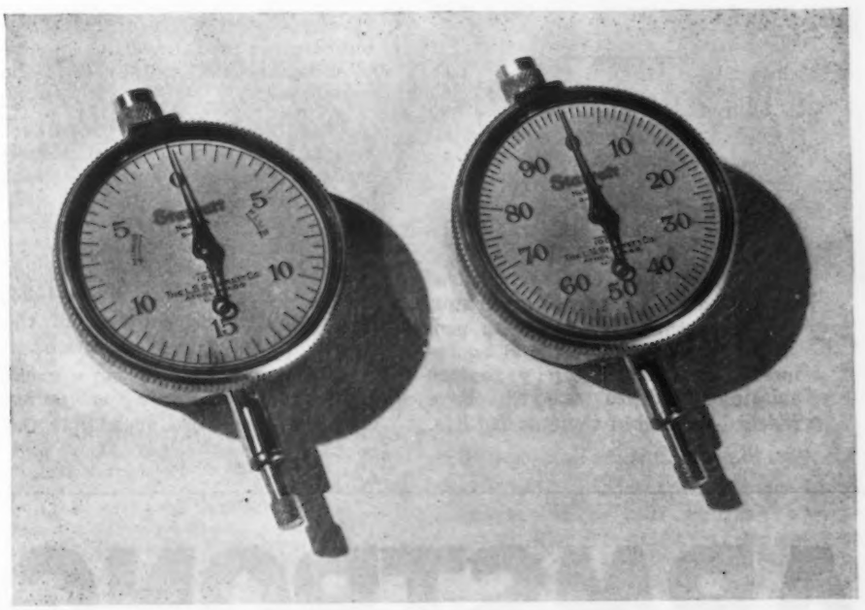
Kelvinator Building Low-Cost Houses

AS a practical demonstration of its contribution to the home-building program in the moderate-income field, Kelvinator Corp. has had constructed in Detroit 11 modern electrically equipped and air-conditioned houses, built at an average cost of $6,000, including architect's fees, builder's profit and real estate broker's commission

Highly rated by the Federal Housing Administration, the houses are equipped with specially tailored year-around Kelvinator air-conditioning equipment, electric refrigerator, electric range, and a total of 18 products making up the so-called Kelvinator package.

Arrangements with contractors, utility companies, and Kelvinator distributors are being completed for the construction for the over 100 such Kelvin houses in various parts of the country. Capital and building materials for the houses, which will be built by independent contracting firms following designs and specfications of Kelvinator engineers, are being supplied locally.

Planned to meet the needs and desires of the American public for homes embodying the latest advances in temperature engineering, the Kelvin house has been designed to make available to families of moderate means, through mass production, the full comforts and conveniences of modern housing science. To this end, equipment has for the first time in this price class been specially designed to maintain an even temperature, to filter and clean the air and keep it at a proper humidity, and to contribute to the health and comfort of the home owner the year-around. Kelvinator equipment throughout the house is included in the $6,000 cost, and a year's free servicing is provided. Other notable features of the building program are the Kelvinator house-material survey and the supervision and complete installation of the refrigeration,



Made to STARRETT Standards

THE things you like most about Starrett Tools—their unfailing accuracy, their lasting dependability, their convenient design features—are all just as prominent in Starrett Dial Indicators. They bring the same speed and precision to gaging operations.

Starrett Dial Indicators are made in a complete range of standard sizes and dial arrangements, or special indicators can be developed to fit your particular problems. Jeweled movements, special cut and finished gears and pinions and stainless steel parts make them extremely accurate and durable.

The Special Starrett Dial Indicator Catalog "AA" illustrates and describes the entire line. We will gladly send it on request.

BUY THROUGH YOUR DISTRIBUTOR

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
Athol, Mass., U. S. A.

Starrett Dial Indicators

cooking and air-conditioning units by Kelvinator engineers.

While the Kelvin house is built on a standard floor plan, in order to facilitate efficiency of production, the specifications are sufficiently flexible to allow a considerable variety in roof lines, mass grouping, etc., and can be accommodated to any one of a number of entirely different exteriors. In this way, the architect, builder, or buyer can give free play to his own tastes and harmonize the house with its surroundings. The standard floor plan calls for a 24 ft. x 26 ft. 8-in. house with living room, dining room, scientifically laid-out kitchen, and breakfast room on the first floor, and three bedrooms and bath on the second floor. A special attraction is the basement, which is unusually large and so designed that it can be converted, if desired, into a roomy recreation or play room.

United Engineers & Constructors, Inc., has been retained by Carnegie-Illinois Steel Corp. to design and supervise construction of a steam power station at South Chicago. The new station is estimated to cost approximately $5,000,000, and will contain three large boilers, a turbo generator, and three turbo blowers with provision for future additional equipment. It will largely replace existing facilities which have reached the end of their useful life.

Steel Employee Elections Participated In by 92 Per Cent of Those Eligible

NINETY-TWO PER CENT of employees of the steel industry participated in recent elections held under employee representation plans in 30 major steel plants throughout the country, according to a compilation of returns by American Iron and Steel Institute.

The elections resulted in the choice of 1898 representatives in the various companies to represent employees in collective bargaining with management.

A total of 275,674 employees of the 30 companies were eligible to vote in the elections, of whom 254,029 cast secret ballots at the polls. Election of 1898 representatives indicates an average of one spokesman for each 145 employees in the companies.

The high percentage of participation in the 1936 elections indicates increasingly active interest by employees of the steel industry in the employee representation plan. In the elections held one year ago, ballots were cast by 90 per cent of the employees while in 1934, approximately 85 per cent of the employees voted in the elections.

It is noteworthy that in a great many instances where the operating schedules were such that the presence of some employees was not required at the plants on election day such men nevertheless made it a point to come in to the polling places to register their choice, according to reports to the institute.

Competition among the employees for election as representatives was keen, the names of 4498 candidates for election as representatives appearing on the ballots. The employees of some companies nominate three candidates for each position as representative, while the employee representation plans in other companies provide for the nomination of two candidates for each position.

More than half of the number of representatives chosen by employees at the recent elections were reelected by their fellow-workers, the report showing that 1048 of the newly-elected spokesmen had served as representatives during the preceding period.

Railroads to Continue Coordinator's Work

RAILROADS of the United States, under the leadership of the Association of American Railroads, will continue the studies of railroad operations which were carried on by the Federal Coordinator of Transportation and the Regional Coordinating Committees of railroad executives, under the Emergency Transportation Act, which expired on June 17, and will effect coordination of facilities and services where practicable, according to J. J. Pelley, president, Association of American Railroads.

Studies of economies through coordination were inaugurated by railroad committees in the Eastern, Western and Southern regions prior to the enactment of the coordinator law. After the passage of that Act in 1933, Federal Coordinator Eastman continued these studies through Regional Coordinating Committees of railroad executives set up under the law and also inaugurated a series of studies covering the general field of railroad operation.

Feeling that further pursuit of all these studies is of importance, the directors of the Association of American Railroads have requested

ARMSTRONG

***Standard and Special Drop Forged* WRENCHES**

With 51 types always in stock . . . all millings, all sizes from tiny miniatures to great 2-man wrenches . . . there are standard ARMSTRONG WRENCHES readily available to meet any normal industrial requirement. And, for those special demands, calls for special wrenches and special millings, an ample stock of forged wrench blanks is maintained to assure delivery on short notice.

ARMSTRONG Wrenches are quality wrenches drop forged from special analysis high carbon steel, improved in designs, in proportions and balance. They are heat treated, hardened and finely finished in black backed enamel with heads ground bright and plainly marked for size. They are stronger, finer tools, still cost no more than other quality wrenches.

Write for Wrench Catalog W-35

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. Francisco Ave., Chicago, U.S.A.

New York San Francisco London

51 ***Standard Types with***

opening milled for U. S. Standard

American Standard

S.A.E. Standard

WHITWORTH Standard and Metric Standard

the railroads in each of the three regions to select an appropriate committee to take up promptly and carry on the study of projects already under consideration, and such other projects as may be presented. These committees are to report to the president of this association, who is also directed to take up with the individual railroads involved, the matter of accomplishing the economies which may be indicated.

In addition to the coordination projects considered by the Regional Coordinating Committees, the Association of American Railroads will continue the study of the various reports of the Federal Coordinator as to possible economies in general railroad operation, with the purpose of putting into effect those which may be practicably attained.

That said committees shall be under the direct jurisdiction of and report to the President of this Association from time to time in such manner and in such detail as he may require.

That the President of the Association be directed to pursue these studies with the individual railroads involved to the end that the economies indicated as possible may be accomplished.

That the President of the Association be directed to have the several reports of general nature as to the railroad industry further studied and make report to this Board the result of such studies and the ends that may be practicably attained thereunder.

New Metal Coating Process Announced

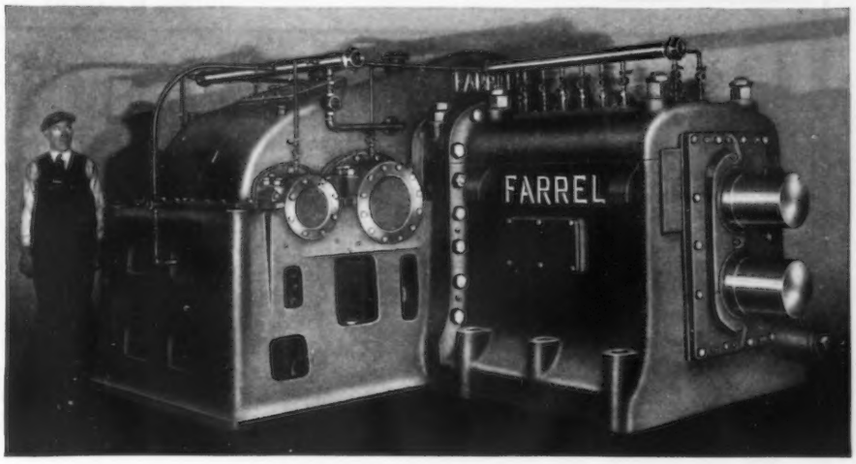
A NEW process whereby thin sheets of pre-finished metal may be adhered to cardboard or other backing materials, retaining the metallic appearance of the sheet, but remaining flexible, has been developed recently by the American Nickeloid Co., Peru, Ill.

Available in any of the company's pre-finished sheets, bright, satin, striped, crimped or corrugated, and in any thickness of metal on almost any type or thickness of backing, this development offers an opportunity to many classes of manufacturers who make use of buttons, buckles, advertising novelties, display stands, signs and decorative panels, to take advantage of this means of obtaining the appearance and effect of a solid sheet of metal at a lower cost and in a lighter weight.

Communities Benefit From Williams Will

UNDER a trust agreement created during his lifetime by the late John C. Williams, former president of the Weirton Steel Co., Steubenville, Ohio, and Weirton, W. Va., and vicinity will be beneficiaries of the principal and interest of a fund which at present amounts to more than $800,000. The provisions under which the funds may be used are so broad that the endowment virtually constitutes a fund for the advancement of the general welfare of the communities affected.

Mr. Williams created the trust by transferring to the Fidelity Trust Co. of Pittsburgh, the trustee, 12,222 shares of capital stock of the National Steel Corp. The trust provides that the income from this stock is to go to his widow during her lifetime. At the death



SPACE-SAVING COMPACTNESS

THE ILLUSTRATION — 400 H.P. Double Reduction Drive with Integral Pinion Stand . . . Sykes continuous tooth herringbone gears and mill pinions . . . tapered roller bearings throughout, including main shaft center bearing of extra large thrust capacity . . . central lubricating system . . . built-in sprays for the gear teeth . . . flood lubricated bearings.

FARREL ROLLING MILL EQUIPMENT also includes: Rolling Mills—Chilled Iron and Special Alloy Iron or Steel Rolls —Universal Mill Spindles—Rod Mill Tables and Manipulating Equipment—Rod Coilers — Lead Presses for Pipe or Rod—Roll Grinding Machines — Roll Calipers — Gears — Mill Pinions — Drives up to 10,000 H.P.

This combined drive and pinion stand is one of four Farrel-Sykes units recently installed for a high speed, four-high continuous cold mill.

Combining the double reduction drive and pinion stand in a single unit reduces the overall length—an advantage where floor space is limited.

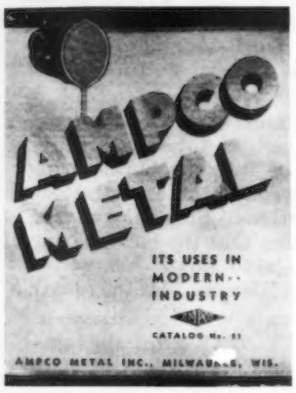
The design provides for rigid connection of both units to assure permanence of alignment. Sykes generated gears and mill pinions, tapered roller bearings throughout and other features of design guarantee maximum efficiency . . . . . smooth, quiet operation . . . . . long life and trouble-free service.

This unit is typical of the advanced engineering applied to Farrel Heavy Duty Rolling Mill Drives. They are designed not only to meet the requirements of modern rolling mill practice but especially to fit the particular conditions in every individual case. *They are engineered to fit the job.*

Farrel engineers are available for consultation on your drive problems. No obligation, of course.

FARREL-BIRMINGHAM
Company, Inc.

100 Main St., Ansonia, Conn.—333 Vulcan St., Buffalo, N.Y.



"AMPCO METAL—*Its Uses in Modern Industry*" is an attractive 32-page booklet just released from the press. Affording complete physical property and application data, engineers will find it of value in their consideration of this unusual alloy for installations where ordinary metals fail.

AMPCO

Write today for your free copy

AMPCO METAL, Inc.

MILWAUKEE WISCONSIN

of Mrs. Williams, both the principal and income of the trust fund are to be used in equal shares in Steubenville, Weirton and vicinity for the purposes stipulated in the agreement. Under the terms of the trust, both capital and income may be applied at the discretion of the trustee as follows:

"To the relief of the poor, the improvement of living conditions, the improvement of working conditions, the care of the sick, the young, the aged, the incompetent, and the helpless, the promotion of science, art, health, recreation, education, and good citizenship among the inhabitants of the city of Steubenville, Ohio, and the city of Weirton, W. Va., and the vicinity thereof, including the Butler district of Hancock County and all of Hollidays Cove, including the portion extending into Brooke County.

"In so applying the funds, the trustee may build or endow hospitals or playgrounds, assist charitable organizations, such as the Young Men's Christian Association and Young Women's Christian Association, or any other association or organization which the trustee considers to be engaged in charitable work beneficial to the community.

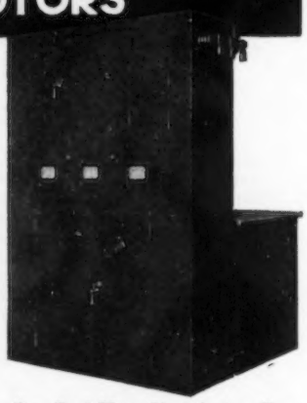
"The donor expressly directs that the powers of the trustee shall be liberally construed and that it shall have power to expend the income or the principal in whole or in part in accomplishing this purpose."

FOOLPROOF *Automatic* STARTING *for* SYNCHRONOUS MOTORS

PUSH BUTTON STARTING with fully automatic acceleration until the motor is running at synchronous speed . . . a simple, fool-proof method of bringing synchronous motors up to speed quickly and with utmost safety.

And with EC&M Synchronous Control Equipment, each starter is a single, self-contained unit. All of the necessary apparatus, such as meters, switches, relays, transformers, etc. is totally enclosed . . . and can be padlocked against tampering. All of the internal wiring is complete and the installation can be made shock-proof by grounding the enclosing case.

Specify EC&M Control for your synchronous motor starting requirements.



For Coal Mine Ventilating Fan . . . 200 HP High Voltage Automatic Synchronous Starter

The ELECTRIC CONTROLLER and MFG. CO., CLEVELAND, OHIO

AUTOMATIC CONTROL *for* CRANES • MILL DRIVES *and* MACHINERY
BRAKES • LIMIT STOPS *and* LIFTING MAGNETS.

Bureau of Standards Circular on Plastics

A RECENT release, circular No. C411, by the Bureau of Standards, Washington, deals with the subject of organic plastics in synthetic resins, natural resins, cellulose derivatives and protein substances. These are discussed from the standpoint of the raw materials required, the chemical reactions involved, the various methods of processing, and the more important applications chiefly in moldable materials.

The synthetic resins are subdivided into chemical types; natural resins of animal, vegetable and mineral sources are described; while the protein plastics considered include those prepared from casein, blood albumin, and soy beans. Selected references are listed for the benefit of those who may desire added information. The references include manufacturers bulletins, trade journals, and three classifications of books on the general subject of organic plastics.

The 1936 convention of the National Foreign Trade Council will be held Nov. 18 to 20 in Chicago, according to an announcement by James A. Farrell, chairman of the council.

The British Steel Export Association has appointed the British Iron & Steel Corp., Ltd., to deal with the export business handled by this association, and all inquiries and other correspondence should be addressed to British Iron & Steel Corp., Ltd., export department, Brettenham House, Lancaster Place, Strand, London, W. C. 2.

Is the NATION *at the* CROSSROADS?

Must The American Electorate Make A Fateful Choice This Fall? . . . That is a matter of opinion. Which Party embraces greater Americanism of principle is also a matter of opinion. . . . . .

But there can be only one opinion about this:

The Issues to be Voted Upon This Presidential Election of 1936 Are the Most Important Put Before the People of the United States Since 1860

Therefore

Do Not Let 57% of the Voters Settle The Issues In Which You Are So Vitally Interested.

WHATEVER YOUR PARTY • WHATEVER YOUR OPINION
HELP GET OUT THE WHOLE VOTE

Urge your employees to register and vote. Allow them time to do both. Post notices, talk to them, remind them and all your business acquaintances, friends and relatives,

THAT A CITIZEN'S FIRST DUTY IS TO VOTE

If intelligent men and women will not vote they betray their country to the unprincipled and ignorant.

The

"GUSHER"

Tank and Pump Unit

will enable you to supply cutting lubricant when and where required. . . . Will increase your production, and prolong the life of your cutting tools. Friction has been decreased to the vanishing point in "GUSHER" Pumps by the correct use of high grade ball-bearings. The fact that there are no metal-to-metal contacts within the Pump itself, enables them to handle grinding Coolants SAFELY.

Improve your Coolant equipment by specifying the "GUSHER" Coolant Pump.

THE RUTHMAN MACHINERY COMPANY
537 East Front St., Cincinnati, Ohio

Cincinnati Milling Machine Co. Holds Open House for 11,000 Visitors

CORDIAL employee relations at the Cincinnati Milling Machine Co., Cincinnati, were concretely illustrated at an open house conducted in the company's newly constructed assembly plant, June 28, when 11,000 employees, relatives and friends were guests of the management. The new plant, constructed at a cost of about $100,000 comprises a building measuring 240 x 100 ft. and will be used to assemble high precision grinding machines.

Since machinery is not yet installed, the new building was used for an assembly room for the guests. The Cincinnati company invited its 2000 employees to attend the Sunday housewarming and bring wives, friends and children to see the place where "daddy works."

The thousands of visitors were taken on an inspection tour of the maze of lathes, grinders, millers and other modern machine shop equipment covering 17 acres of floor space. In addition, they saw up-to-date equipment for protection of health, insuring good ventilation and preventing accidents, as well as the latest conveniences for the comfort and cleanliness of workers.

About 3000 persons packed the assembly hall at each of several entertainments conducted for the pleasure of the visitors. Dr. Otto P. Geier, widely known for his work in industrial medicine and prominent in movements for employee benefit, opened each performance and introduced Phillip O. Geier, chairman of the board. Phillip O. Geier welcomed the guests and read a radiogram from Frederick V. Geier, president, who is now on his way to England on business.

An employees' hobby show was conducted in the apprentices' school where 100 young men receive training and free tuition to Ohio Mechanics' Institute in preparation for their work in the company's shops (see picture on page 112).

HAVE YOU A CLUTCH PROBLEM?

—One where synchronization, remote control, operating safety and dependability are demanded?

There isn't any better solution than a Dings Magnetic Clutch.

Dings Magnetic Clutches will answer your demands for strength, quick action and long life.

There is a size for every problem. Let us tell you what we can do.

Dings High Intensity MAGNETIC CLUTCHES

DINGS MAGNETIC SEPARATOR CO.
727 Smith St., Milwaukee, Wis.

Since 1899 Dings engineers have been building magnetic equipment. Here is experience that no other manufacturers of this type of equipment can offer. Such experience has a real dollars and cents value to you.

Announces New Metal Finishing Process

A METAL finishing process for producing a blue-black satiny finish on small and large products made from iron and steel is being announced by A. F. Stoeger, Inc., 507 Fifth Avenue, New York. Known as the Black Diamond "Lightning Bluer," this immersion process is said to give a distinctive finish in 15 min. Simplicity, ease of application and low cost per square foot of surface finished are features emphasized. A temperature of only 270 deg. is required, and the process involves no special equipment. Advantages claimed include absence of scaling, peeling, chipping and of discoloration, and no altering of dimensions.

United Airlines has purchased five additional 21-passenger, twin-engine Douglas transports at a cost of $103,000 each.

Welding Society Completing Plans for Fall Meeting

MORE than 25 papers are planned for the seven technical sessions of the 17th annual meeting of the American Welding Society, to be held at the Hotel Cleveland, Cleveland, Oct. 19-22. Two of these sessions will be held jointly with the American Society of Mechanical Engineers and two additional welding sessions, to which members of the A.W.S. are invited, have been arranged by the A.S.M.E. for Friday, Oct. 23, as noted below. The A.W.S. meeting will open with the usual business session. An exposition of welding equipment and supplies will be held at the Public Auditorium throughout the week of Oct. 19.

The program of technical sessions follows:

MONDAY, OCTOBER 19

Afternoon

Chairman: A. E. Gibson, Wellman Engineering Co.

Vice-Chairman: E. Vom Stegg, General Electric Co.

Fundamentals of Metallurgy of Welding, by E. S. Davenport and Dr. R. H. Aborn, United States Steel Corp.

Multi - Layer Oxyacetylene Pipe Welding, by R. M. Rooke, F. C. Saacke and A. N. Kugler, Air Reduction Sales Co.

High-speed motion pictures of various welding processes, by E. Vom Stegg, General Electric Co.; W. E. Crawford and Walter Richter, A. O. Smith Corp.

TUESDAY, OCTOBER 20

Morning

Fundamental Research in Welding

Chairman: H. M. Boylston, Case School of Applied Science.

Vice-Chairman: E. R. Fish, Hartford Steam Boiler Inspection & Insurance Co.

Heating by the Proximity Effect, by Edward Bennett, University of Wisconsin.

The Welding of Copper, by A. P. Young, Michigan College of Mining and Technology.

Non-Destructive Testing of Welds, by W. B. Kouwenhoven, Johns Hopkins University.

Impact Tests of Welds at Low Temperatures, by Otto Henry, Brooklyn Polytechnic Institute.

Afternoon

Fundamental Research in Welding

Chairman: H. W. Gillett, Battelle Memorial Institute.

Vice-Chairman: R. E. Kinkead, consulting engineer.

X-Ray Methods for Studying Stress Relief, by J. T. Norton, Massachusetts Institute of Technology.

Welded Beam-Column Connections, by Inge Lyse, Fritz engineering laboratory, Lehigh University.

Circuit Characteristics and Arc Stability, by S. C. Osborne, Wilson Welder and Metals Co., Inc.

Welded Structural Brackets, by C. D. Jensen, Lehigh University.

WEDNESDAY, OCTOBER 21

Morning

Chairman: A. F. Davis, Lincoln Electric Co.

Vice-Chairman: C. A. McCune, Magnaflux Corp.

Brazing with Silver Solders, by R. H. Leach, Handy & Harman, Inc.

Importance of Design Control for Welded Piping System, by T. W. Greene, Linde Air Products Co.

Principles of Surfacing by Welding, by E. W. P. Smith, Lincoln Electric Co.

Technique for Resistance Welding Ferrous and Non - Ferrous Sheet Metals, by E. I. Larsen, P. R. Mallory Co.

Afternoon

Chairman: Hugh H. Dyar, Linde Air Products Co.

Vice-Chairman: J. B. Tinnon, Metal and Thermit Corp.

Procedures for Control of Welding Parts, by G. H. Moore, Jr., Newport News Shipbuilding & Dry Dock Co.

Welding Copper and Its Alloys—a Review of the Literature, by Ira T. Hook, American Brass Co.

Resistance Welding of Dissimilar Metals, by R. T. Gillette, General Electric Co.

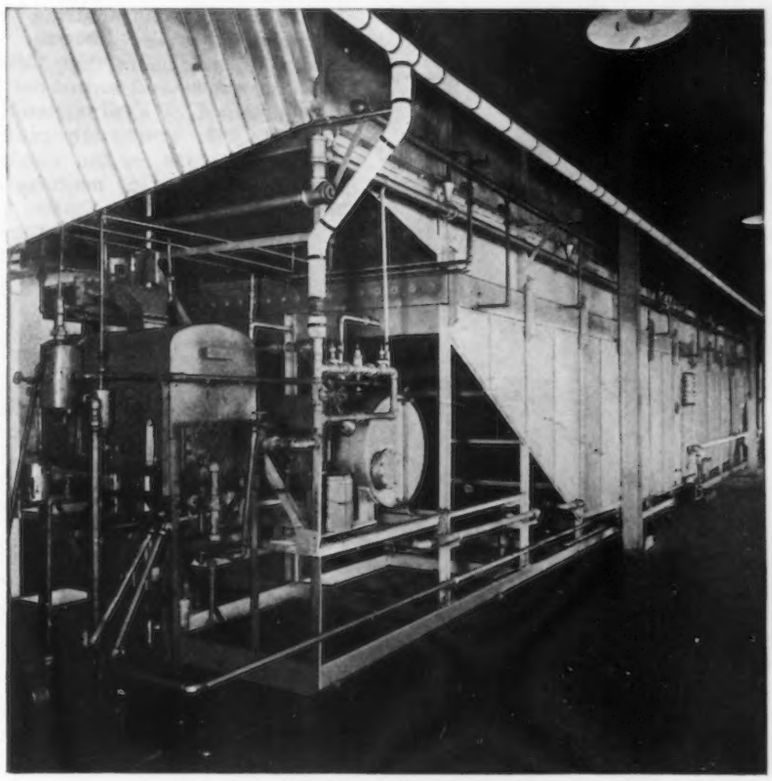
Thermit Welding, by J. H. Deppeler, Metal & Thermit Corp.

Exploration of the Modern Metallic Arc, by L. J. Larson, A. O. Smith Corp.

THURSDAY, OCTOBER 22

Morning

Joint Session with American Society of Mechanical Engineers.



How DODGE

licks its big degreasing problem

In this mammoth conveyor-type DETROIT REX DEGREASER, Dodge fenders as well as other sheet metal parts, are quickly and thoroughly cleaned of all oil and grease before they go to the paint shop. The Detroit Rex Products organization is justly proud of this outstanding installation which contributes toward the splendid finish on Dodge cars.

DETROIT REX PRODUCTS CO. • 13005 Hillview Ave., Detroit, Mich.

"The Largest DEGREASER *ever built"*

Chairman: C. W. Obert, Union Carbide & Carbon Research Laboratories, Inc.
Vice-Chairman: Milton Male, United States Steel Corp.
Stress Analysis, by C. H. Jennings, Westinghouse Electric & Mfg. Co.
Alloy Steels and Their Weldability, by A. B. Kinzel, Union Carbide & Carbon Research Laboratories.

Afternoon

Joint Session with American Society of Mechanical Engineers.
Chairman: H. F. Henriques, Air Reduction Sales Co.
Vice-Chairman: S. M. Weckstein, Timken Roller Bearing Co.
Welding Heavy Machinery and Equipment, by C. A. Wills and F. L. Lindemuth, Wm. B. Pollock Co.
Steel Plate Construction.
Using Steel Plates for Machine Frames.

FRIDAY, OCTOBER 23

Morning

Auspices of the American Society of Mechanical Engineers

Weldability of Copper, Brass and Bronze, Monel Metal, Aluminum.

Afternoon

Auspices of the American Society of Mechanical Engineers

Review of Welding Developments as They Affect Mechanical Design.
Welding of Light Machines and Products.
Principles Involved in Selecting Casting vs. Welding.

Commerce Department Report on Machinery Emphasizes Importance

THE employment importance of American machinery industries, compared with other groups, is summarized in a 55-page pamphlet issued by the Department of Commerce. Prepared by R. E. W. Harrison, formerly chief of the machinery division, and Charles O. Thompson of the marketing research division, the pamphlet is designated as Domestic Commerce Series No. 93.

The Department notes that in 1933, the latest period for which complete data are available, the machinery manufacturing group employed over 500,000 wage earners, paid more that $500,000,000 in wages, and turned out products valued at approximately $2,000,000,000. It officially ranks the group as fifth in the number of establishments in manufacturing fields in the United States, fourth as to number of wage earners, and fifth as to value of products.

Following 1933, according to the summarization, the group has steadily increased its employment, wages and the value of its products.

The compilation of facts as presented in the pamphlet, constitutes a statistical record of data gathered from a long list of sources and from practical contacts with various elements making up this manufacturing group, which does not include transportation equipment builders.

Machine tools are held to be those machines which are employed primarily in the working of metals. This branch comprises less than 250 American companies who are accredited with major service in building up thought and progress from economic, business, and employment viewpoints. This industrial element is treated historically up to the present day. Its activity, the review states, provides a safe barometer-reading as to business conditions.

The compilation develops and tabulates trends, locations of businesses, and facts concerning employments and payrolls. Comparative data in relation to durable and non-durable production are charted in a uniform manner.

Recapitulation of studies as to the relationship between earnings and obsolescence are presented in tabulated form. These are followed by classified estimates of potential requirements, due to obsolescence, with percentages given as to the value of each classification with respect to the whole. Examples of savings through modernization of equipments are given with information as to methods of financing.

The character and importance of the industrial market is outlined with sub-divisions of purchaser types, main channels of distribution, and an outline of special considerations which pertain to certain types of demand. The dollar significance of foreign markets and competition is covered by charts and tabulations drawn from established records.

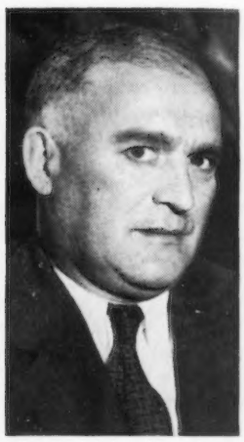
Five pages of employment information are presented, giving monthly wage figures over a 10-year period, 1925-1935. Eight pages are devoted to accredited sources of information, so compiled as to provide ready reference for additional study of segregated group elements. These references include foreign and domestic departmental publications, reports, trade paper articles, and periodical publications of a statistical nature.

The Handicap OF TRADITION

The *Continuous Flow Principle* is the most revolutionary concept that has entered into industrial thinking in fifty years. But despite its almost sensational application in some industries many others remain so traditionally minded that they have failed to see how universally applicable this principle is. There is no mill, foundry, or shop in the metal trades which cannot be made more efficient by adapting this basic principle of handling materials. Investigate. Ask for the book "Problems Solved with Mathews Conveyer Systems."

MATHEWS CONVEYER COMPANY
San Francisco, Calif. ELLWOOD CITY, PENNA. Port Hope, Ont., Can.

FRED J. LAMBORN, operations manager, Dodge division of Chrysler Corp., has been named vice-president in charge of manufacturing of the division. Mr. Lamborn began his service with Dodge Brothers 25 years ago as a toolmaker and soon worked his way up to the job of general foreman



F. J. LAMBORN

of the tool department. During the War, when the Dodge plants became a scene of intense munitions making activity, Mr. Lamborn became master mechanic of the ordnance plant, a position which he retained after the close of hostilities, when he was appointed master mechanic of the Dodge passenger car and truck factories. Following a long period of service in this capacity, Mr. Lamborn was appointed operations manager for all Dodge properties, a position which he has held up until the time of his recent advancement.

❖ ❖ ❖

WILLIAM H. PHILLIPS, heretofore with the Harry Pratt Co., Chicago, has joined the Worthington Pump & Machinery Corp., as power plant specialist, with headquarters at the company's Chicago office. He was formerly identified for many years with the Worthington company.

❖ ❖ ❖

JOHN J. HILT, who has been connected with the Young Radiator Co., Racine, Wis., for the past 16 years, has been appointed vice-president in charge of sales, contract division.

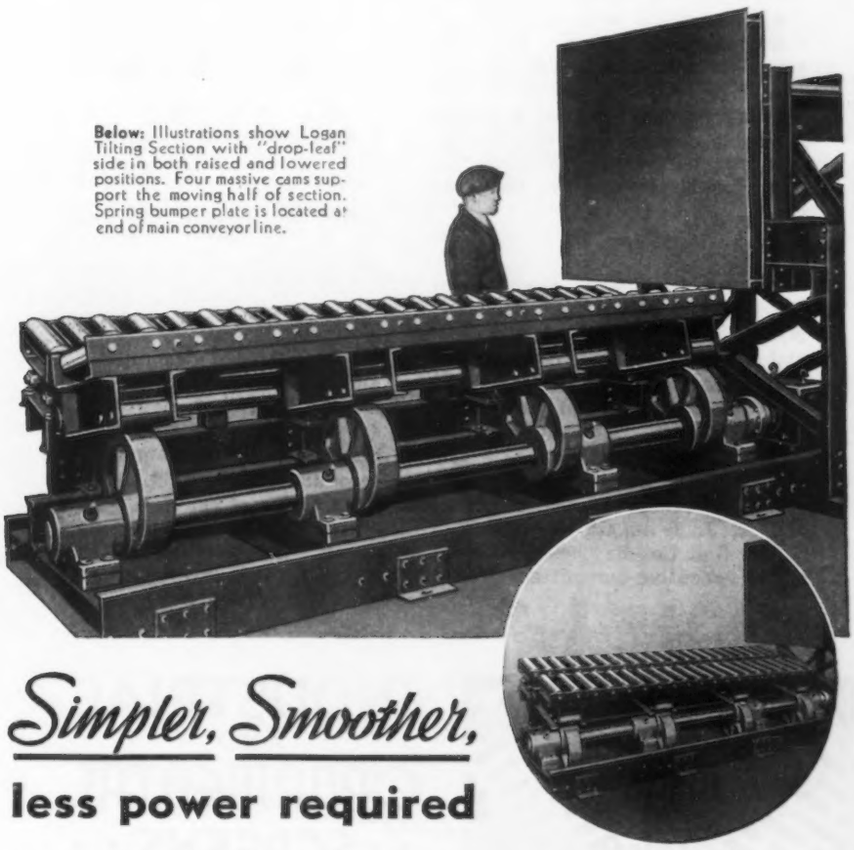
❖ ❖ ❖

EARL E. WRIGHT has been appointed representative in eastern Tennessee, with headquarters in Chattanooga, for the American Electric Furnace Co., Boston. A. D. HEATH, 1701 North Illinois Street, Indianapolis, will handle sales in Indiana and CLYDE J. BOERINGER, 7412 Race Street, Pittsburgh, is to be direct factory representative in western Pennsylvania and West Virginia.

❖ ❖ ❖

W. H. BULEY, formerly sales supervisor in Milwaukee for the Globe Steel Tubes Co., Milwaukee, has been placed in charge of the company's newly-opened sales office in the Starks Building, Louis-

Below: Illustrations show Logan Tilting Section with "drop-leaf" side in both raised and lowered positions. Four massive cams support the moving half of section. Spring bumper plate is located at end of main conveyor line.



Simpler, Smoother,

less power required

● Logan Tilting Sections—are used where coils must be transferred at right angles from a line of trough conveyor.

In Logan construction ***the entire unit does not pivot.*** One half is in fixed position, the other half is lowered by motor-driven cams to permit coil to roll off. This "drop-leaf" section provides a simpler, smoother, better-controlled transfer, and a minimum of power is required to lower the load and return the empty "drop-leaf" to carrying position.

Coils are stopped on Section by brakes applied to under side of rolls, or by spring bumper if Tilting Section is located at end of line. Brakes in the line preceding section permit feeding of coils one at a time. For complete details, ask the nearest Logan engineer or write on your letterhead, for Bulletin No. 10. LOGAN CO., Inc., 545 Buchanan St., Louisville, Ky.

Logan Conveyors
LOUISVILLE

ville, Ky. C. J. BICKLER, heretofore sales engineer in the home office, has been made manager of sales of the Cleveland district, with offices in the Terminal Tower Building. C. D. HAVEN, of the Chicago office, will be associated with Mr. Bickler in Cleveland.

❖ ❖ ❖

ROBERT S. ROSE, of the service and metallurgical department, Vanadium-Alloys Steel Co. and Colonial Steel Co., will be transferred on July 1 from Springfield, Mass., to Boston, to fill the vacancy caused by the death of Jim Mitchell, the oldest sales employee of Colonial Steel Co. Mr. Rose has been located in Springfield for the past five years, handling district service and metallurgical work. He has been chairman of the Springfield chapter of the American Society for Metals for the past two years.

❖ ❖ ❖

ARTHUR D. MORRIS, president of the Bayonne Bolt Corp., Bayonne, N. J., has been elected president and chairman of the executive committee for 1936-37 of the American Institute of Bolt, Nut and Rivet Manufacturers, Guardian Building, Cleveland. GEORGE S. CASE, president of Lamson & Sessions Co., Cleveland, is vice-president, and R. J. WHELAN, of the Ohio Nut & Bolt Co., has been reelected to the executive committee.

R. S. ROSE

This Week On The Assembly Line

(CONTINUED FROM PAGE 69)

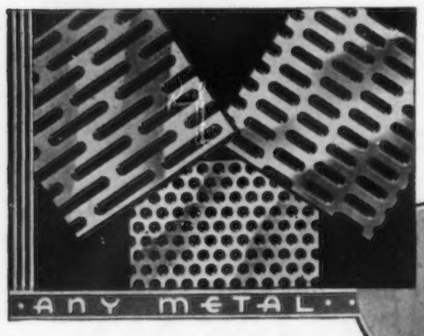
cussions between management and the workers. They are by no means recognized, however, as the sole bargaining agency in the plant. The Bendix company merely recognized their right to speak for the fraction of the men they represented and to counsel with the group. The settlement also involved the promise of a review of present wage schedules when the new parts contracts are in around Sept. 1. Problems regarding seniority rights were also involved.

Just what the automobile manufacturers will do about the present drive is problematical. There has been union activity going on in the plants in a small way for some time, and the general attitude of management has been to ignore it.

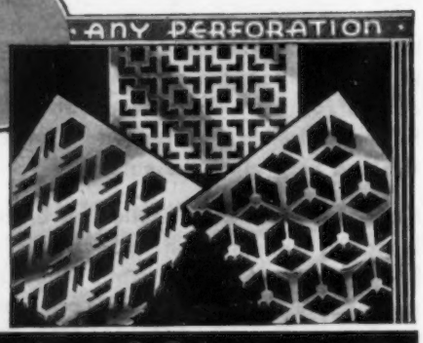
Drive To Begin With Small Parts Plants

Part of the strategy of the new group seems to be to start the drive on small parts plants rather than on big corporation shops. The lessons learned time and again at Ford Motor Co. are impressive. Furthermore, it is probable that the larger part of the drive will be out of the city of Detroit, which is extremely well controlled from the employer's point of view. Detroit is perhaps one of the most outstanding open-shop minded cities in the United States. It has a Board of Commerce that has stood openly for the open shop for years. Employer groups have seen to it that the City Council and the Mayor, with his power of Police appointments, have been "right" on this score, and the manufacturers have also watched carefully the records of those elected to the State Legislature.

The labor group sensing this well-organized opposition, is also planning a campaign somewhat along political lines. Its leaders foresee little chance of having legislature suited to labor passed, unless men favorable to organized labor are elected to office. Labor leaders claim that they will use the strike weapon only as a last resort and that they are not desirous of disrupting industry. On the other hand, they do indicate that they intend ultimately to win their aims, come what may. Their objectives, however, are not to be attained overnight. It is, therefore, expected that there will be little or no attempt made at a trial of strength until a well-controlled organization has been built up all along the line. Manufacturers, on the other hand, fear for the worst, should organized labor get a foothold in the automotive industry. Detroit boasts one of the cleanest political records of the largest cities in the country, and attributes a great deal of its success in maintaining free relations between employer and employee to the complete absence of a labor-political set-up of the racketeering type. Detroit will fight to the last ditch to maintain its open-shop traditions.



INDUSTRIAL AND ORNAMENTAL SCREENS



Industrial screens perform at highest efficiency with H & K precision perforations, which are made in all metals to meet exacting requirements.

Ornamental Perforations for Grilles and Enclosures. Many beautiful and exclusive designs from which to select.

Send us your specifications for quotation.

The Harrington & King Perforating Co.

5657 Fillmore Street, Chicago, Illinois ● 114 Liberty Street, New York, N. Y.

...OBITUARY...

Charles Lundberg

CHARLES LUNDBERG, who for 25 years had been connected with THE IRON AGE organization, from 1911 to 1919 as a member of its editorial staff, and from late 1919 as advertising representative in the Philadelphia territory, died suddenly on July 4 at his home in Upper Darby, a Philadelphia suburb. Prior to entering the service of this paper he was for several years night manager of the New York City News Association, to which he went from a reportorial position with the New York *Morning Advertiser*. He was born in New York in 1875. His first work after leaving Binghamton, N. Y., high school was in a jobbing machine shop there. Later he worked several years at the machinist's trade in Ampere, N. J., Jersey City and New York. The practical knowledge of machinery thus gained was valuable preparation for the broader fields in which he labored so effectively in the last quarter century. For years he was an associate member of the American Society of Mechanical Engineers, and a member of the Machinery Club of New York.

In his earlier service with THE IRON AGE he had charge of its New York machinery market report and at the same time covered its nonferrous metal market. Both departments he conducted with signal success, and after four years he was assigned in addition to the important iron and steel market work in Philadelphia. In 1917 he was sent to Chicago as THE IRON AGE's Western editor, and his two and a half years in that position were marked by growing influence and accomplishment.

Mr. Lundberg's possession of editorial and advertising aptitudes, not often found in industrial journalism, led in 1919 to his appointment as advertising manager of THE IRON AGE at Philadelphia.

A friend and business associate of many years writes of the deceased as follows:

"THE IRON AGE mourns one of its

YALE TRUCKS
help speed up "THE NEWS"

DAILY NEWS FINAL
THE NEWS
NEW YORK'S PICTURE NEWSPAPER
220 EAST FORTY SECOND STREET
NEW YORK
J. W. BARNHART
BUSINESS MANAGER
June 12, 1936.
Yale & Towne Mfg. Co.,
Philadelphia, Pa.
Dear Sirs:
We purchased two Model K 27 High Lift Yale electric industrial trucks in 1929. They have been and are in constant use handling rolls of newsprint paper from trucks and elevators to our storage floors.
These trucks tier the rolls of paper three high and have handled 500 rolls averaging 1,650 lbs. each in a day, without damage to the paper. The rubber tires preserve our cement floors.
These trucks have helped solve the problem of hard manual labor in the handling of roll paper and have performed the work they were purchased for economically and to our entire satisfaction.
Very truly yours,
NEWS SYNDICATE CO. INC.
J. W. Barnhart.

-YALE-

YALE ELECTRIC TRUCK
High Lift Model

Providing tremendous lifting and hauling power and the durability to stand up under the hardest kind of service. There are numerous other models with modifications to meet every individual plant requirement.

Speed, speed and more speed is the demand in the great plant of the New York Daily News where more than a million and a half copies of The News are printed and distributed daily and nearly three million on Sunday. The letter reproduced above shows that YALE Trucks are meeting that demand. They provide, not speed alone, but the important added factors of efficiency, economy and safety.

A Materials Handling Survey of your plant by a YALE Expert is yours for the asking. No obligation.

THE YALE & TOWNE MFG. CO.
Philadelphia Division, Philadelphia, Pa., U.S.A.

YOU
"CAN'T BUY"
Another Eye

But You CAN BUY
"MAXIMUM"
EYE PROTECTION

In one year's time over one and a quarter million dollars was paid out in "Compensation" fees, in one state alone, for eye injuries, to say nothing of the untold suffering that has been caused. This is a grim, repellant fact.

But, you can greatly reduce the amount of Compensation and untold suffering in your plant by specifying Super-Drednaut Goggles for your men—the goggle that provides MAXIMUM eye protection. It is the cheapest eye insurance that you can buy.

Super-Drednaut Goggles embody valuable features not found in any other make of goggle—features that make men WANT to wear goggles.

Send for a sample pair today and put them to the test.

Complete Catalog on Accident Prevention equipment will be sent FREE upon request.

The Safety Equipment Service Company

(Buell W. Nutt, President)

1228 St. Clair Ave., Cleveland, O.

Manufacturers of a Complete Line of Accident Prevention Equipment.

own. It is therefore fitting that we deviate from our customary, severe journalistic restraint to inscribe indelibly on the records our feelings for one who so wholly commanded our regard and affection. All who were associated with him can say, in the words of the great poet, 'He was my friend, faithful and just to me.' His radiant personality attracted friends. He cherished them and they in turn clung to him.

"'Charlie' Lundberg was not an ordinary man. Though unassuming and without the distinction of wealth or high position, he nevertheless had qualities that set him apart. Frank at times to the extent of being almost blunt, he was withal sensitive and sympathetic and generous to a fault.

"His long journalistic experience gave him an insight into all sides of life. He understood the frailties of human nature, the meaner motives of men, but sophistication and cynicism were repugnant to him. Even in his later years, when illness bore heavily upon him, he struggled valiantly to preserve his naturally wholesome, cheerful and balanced attitude toward life.

"He had a wistful strain. Though conscious of life's grimmer realities, he tried to ignore them, ever hoping to find in the world the qualities that he himself so abundantly gave to it. Until the end he remained friendly and straightforward, without wile or guile, unsullied and unspoiled after many years of contact with people in all walks of life—the high and the low, the distinguished and the disreputable, the good, the bad and the indifferent. Of him it can truly be said,

"'His life was gentle, and the elements
So mix'd in him that Nature might stand up
And say to all the world, "This was a man!"'"

❖ ❖ ❖

HENRY OLIVER, chairman of the board of the Oliver Iron & Steel Corp., Pittsburgh, until his retirement in 1932, died at his home in Sewickley, Pa., on July 1, aged 73 years. Mr. Oliver, one of the leading industrialists of Pittsburgh, was educated in the public schools of old Allegheny, later entering Yale University, from where he graduated in 1885. His business career began in the Hainsworth steel plant and he was associated with it until it became a part of the United States Steel Corp. at the beginning of this century. From 1905 until 1927 Mr. Oliver served as president of the Oliver Snyder Steel Co., a subsidiary of the Oliver Iron & Steel Corp. Since his retirement in 1932, Mr. Oliver spent considerable time at his farm in Lexington, Ky.

❖ ❖ ❖

FRANK H. ROBINSON, New York sales representative of the Potter-Johnston Machine Co., Pawtucket, R. I., died at his home in New York on May 30. He had been identified with the company for the past 40 years.

Mackintosh-Hemphill Reorganization Plans

THE trusteeship of the Mackintosh-Hemphill Co., Pittsburgh, was practically terminated last week when Judge R. M. Gibson, in Federal Court, confirmed the amended plan of reorganization as submitted by the company. A near-record for this type of proceeding was established when virtually unanimous consent was submitted on behalf of all parties: creditors, bondholders, stockholders, banks, etc. There was not a single dissent.

The company will now proceed to put the reorganization into effect and will report to the Court July 9 on the steps it has taken. At that time, the Court will probably sign the final decree and the company will officially emerge from 77-B.

H. V. Blaxter, chairman of the board of the company, informed the court that the company had made money each month since April, 1935, had operated at a profit all through the trusteeship and comes out of the reorganization with unimpaired credit and in splendid working condition.

To effect the reorganization, a new issue of $750,000 of bonds was authorized. Of this, $595,000 are to be issued to the present bondholders in exchange for their old bonds, and the balance held in the treasury for future sale.

The petition under 77-B was filed Oct. 10, 1935. No trustees were actually appointed; the Court directing the company to operate under its own officers. In the early part of this year, the company sold its Wooster, Ohio, plant for $550,000, but it retains plants in Pittsburgh and Midland, Pa. The company makes rolls and castings for steel, non-ferrous, rubber and other plants and does miscellaneous machine work. It does a large export business, principally to India, Australia, England and to continental Europe. It has been in continuous operation since 1803.

Steel Ingot Production Recedes Only Slightly During June

PRODUCTION of bessemer and open-hearth steel ingots in June declined 61,408 tons from the preceding month to a total of 3,984,845 tons, according to report of the American Iron and Steel Institute. This compares with output in May of 4,046,253 tons and in June, 1935, of 2,258,664 tons. Total production for the first six months amounted to 21,326,335 tons, as against 16,042,651 tons in the corresponding period a year ago, an increase of approximately 33 per cent.

Based on 26 working days, daily production during the month was at the rate of 153,263 tons, and operations averaged 69.83 per cent of capacity. During May, when the same number of working days was involved, daily output was somewhat higher at 155,625 tons, while operations were 70.91 per cent. In June, 1935, however, the daily rate came to but 90,347 tons on a working schedule of 25 days. Operations averaged 40.81 per cent of capacity. For the first half year, the industry produced 136,707 tons daily, compared with 103,501 tons comparably in 1935. Average operating rates were 62.29 per cent and 46.75 per cent respectively

. . TRADE NOTES . .

Milwaukee Metal Spinning Co. has moved to its new plant at 1325 South 43rd Street, Milwaukee.

Cutler-Hammer, Inc., Milwaukee, has moved its Los Angeles office to 1331 Santa Fe Avenue. W. G. Tapping is in charge.

Wills & Hill, metal building specialists, have moved their Boston office to 99 Bedford St. They have been made Boston representatives of the William Bayley Co., Springfield, Ohio, maker of metal windows, doors.

United Engineering & Foundry Co., Pittsburgh, has removed its Chicago sales office to 2376 East Seventy-First Street.

REPORTED BY COMPANIES WHICH IN 1934 MADE 97.91 PER CENT OF THE OPEN-HEARTH AND 100 PER CENT OF THE BESSEMER INGOT PRODUCTION

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of Working Days	Per Cent of Operation
1934	Open-Hearth	Bessemer	Monthly	Daily		
January	1,786,458	172,489	1,997,129	73,968	27	33.59
February	1,993,465	175,873	2,211,944	92,164	24	41.86
March	2,540,243	203,904	2,798,440	103,646	27	47.07
April	2,622,531	257,482	2,936,064	117,443	25	53.34
May	3,003,676	331,620	3,399,494	125,907	27	57.18
June	2,718,782	282,592	3,059,483	117,672	26	53.44
July	1,340,924	119,869	1,489,453	59,578	25	27.06
August	1,245,139	109,598	1,381,350	51,161	27	23.24
September	1,127,269	117,615	1,268,977	50,759	25	23.05
October	1,325,777	127,789	1,481,902	54,885	27	24.93
November	1,447,626	132,059	1,610,625	61,947	26	28.13
December	1,794,437	131,467	1,964,257	78,570	25	35.68
Total	22,946,327	2,162,357	25,599,118	83,312	311	37.38
1935						
January	2,578,531	239,858	2,870,161	106,302	27	48.02
February	2,499,744	224,336	2,774,271	115,595	24	52.22
March	2,582,628	230,810	2,865,292	110,204	26	49.78
April	2,361,275	231,916	2,640,602	101,562	26	45.88
May	2,332,042	254,796	2,633,661	97,543	27	44.06
June	2,007,862	210,487	2,258,664	90,347	25	40.81
July	2,003,151	224,456	2,267,827	87,224	26	39.40
August	2,629,768	233,361	2,915,930	107,997	27	48.78
September	2,540,264	233,737	2,825,004	113,000	25	51.04
October	2,815,510	270,719	3,142,759	116,398	27	52.58
November	2,841,199	252,163	3,150,409	121,170	26	54.73
December	2,789,015	228,392	3,073,405	122,936	25	55.53
Total	29,980,989	2,835,031	33,417,985	107,453	311	48.54
1936						
January	2,793,421	196,389	3,045,946	112,813	27	51.40
February	2,707,562	202,445	2,964,418	118,577	25	54.03
March	3,095,375	185,040	3,342,619	128,562	26	58.58
April	3,565,821	304,775	3,942,254	151,625	26	69.09
May	3,670,401	302,092	4,046,253	155,625	26	70.91
June	3,578,044	334,897	3,984,845	153,263	26	69.83
Six Months	19,410,624	1,525,638	21,236,335	136,707	156	62.29

Order Daytons

BEFORE

the Accident

Don't wait until after a costly accident to equip with Dayton Safety Ladders. Daytons pay for themselves not only in accident prevention, but in promoting faster and better work.

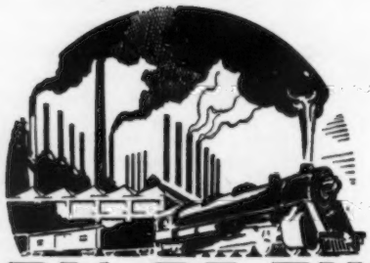
Made of durable airplane spruce—light, strong, easy to carry. Straight back permits close work. Sizes 3 to 16 feet.

Write Dept. IA-7 for details

THE DAYTON SAFETY LADDER COMPANY
121-123 West Third St., Cincinnati, O.

DAYTON Safety Ladder
(Patented)

Stock carried on Pacific Coast by E. D Bullard Co., Los Angeles and San Francisco, and by 160 other distributors from coast to coast. Made and distributed in Canada by Safety Supply Co., Toronto.



. . . . SUMMARY OF THE WEEK. . . .

. . . Steel production declines only 1½ points to 70 per cent.

o o o

. . . Heavy backlogs assure well sustained operations through July.

o o o

. . . Threat of labor trouble has not yet led to heavy anticipatory buying.

HEAVY shipments against old orders are sustaining steel production in the face of light demand, and ingot output this week is off only 1½ points to 70 per cent of capacity. While the trend is now definitely downward, mill backlogs are believed to be sufficiently large to prevent any sharp decline during July.

The threat of serious labor trouble is also growing in importance as a market factor, and if anticipatory covering by steel users increases in volume, it will serve to sustain steel output against the seasonal trend. As yet very few buyers have translated their fear of strikes into actual orders.

THE ideas of the industry regarding the unionization drive are almost unanimous. Practically all companies are sincere in their determination to refuse union recognition and they also believe their employees are satisfied with the collective bargaining facilities provided by employee representation plans. It is therefore apparent that very severe pressure on the part of either the professional unions or the Federal Government would have to be exerted to change this point of view.

JUNE pig iron production was at the rate of 86,208 tons daily, a gain of nearly 1 per cent over the 85,432 tons poured daily in May. With one less working day, however, June output declined to 2,586,240 tons from 2,648,401 tons in the preceding month.

A check in production was indicated late in the month, as only 145 furnaces were operating July 1, compared with 146 on June 1. They were making iron at a rate of 85,405 tons daily, against 86,030 tons one month before. Pig iron output in the first half totaled 13,528,226 tons, a 37 per cent gain over the 9,799,000 tons produced in the first six months of 1935.

THE beginning of the new quarter has not brought as pronounced a falling off in steel demand as had been anticipated. The volume of small orders being taken at the higher prices is considerable and much of the steel now being shipped against old contracts is apparently going directly into consumption.

Curtailment in the requirements of the automobile and agricultural implement industries has thus far been offset by heavier demand from the railroads and the construction field. While this balance can scarcely be maintained, it is very encouraging. Miscellaneous consumption is still expanding and the percentage of total rolled steel taken by this group in the first half is believed to have gained at the expense of the automotive industry.

RAILROAD purchases include 20,000 tons of rails by the Chesapeake & Ohio and 5500 by the New York Central. The Lehigh & New England is in the market for 250 hopper cars and the Maine Central is considering the purchase of 800 freight cars and three locomotives. The Great Northern is said to be deferring its rail purchases because of the drought in its territory. No other positive effects of the drought have yet been reported, but it is believed that another week will bring out depressing concrete evidence.

Contracting on identified structural steel jobs at the old prices is responsible for structural steel lettings this week of 44,650 tons, compared with 36,815 tons in the previous period. New projects, however, call for only 19,220 tons, against 38,700 tons. Lettings of construction steel reported to THE IRON AGE in the year to date amount to 944,350 tons, an increase of 43 per cent over the 659,335 tons in the corresponding 1935 period.

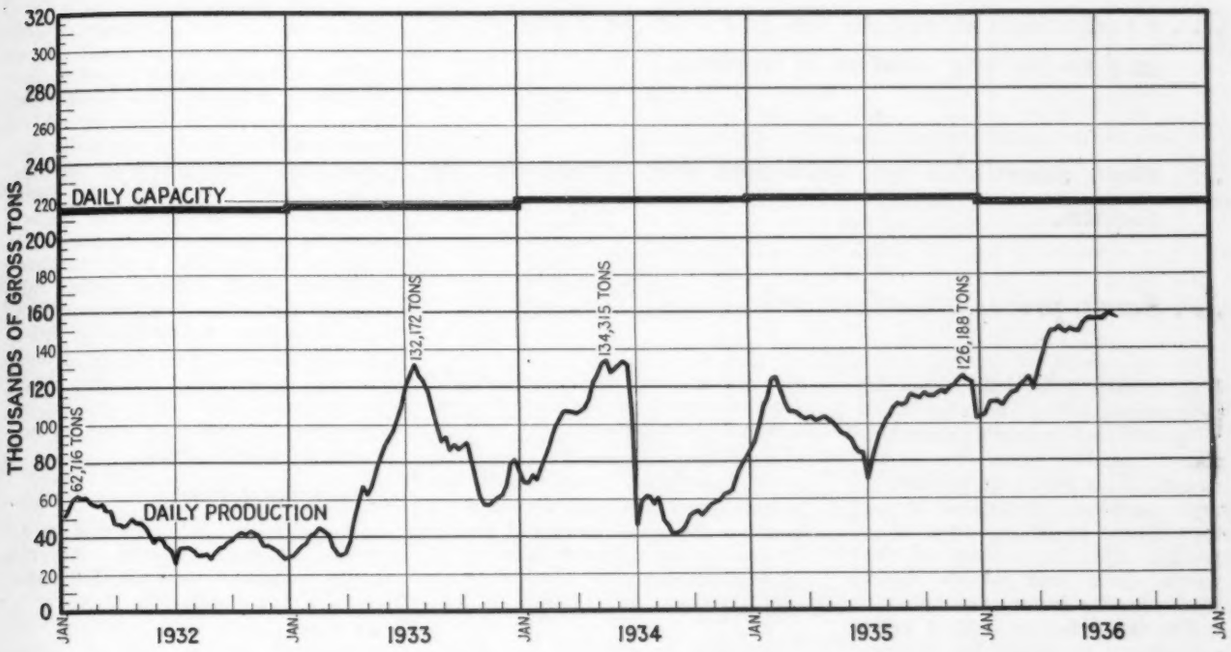
THE IRON AGE composite price of finished steel has been raised 74c. a ton by advances on bars, plates and shapes. At 2.159c. a lb., it is at the highest level since early July, 1934, and the 2.199c. figure which prevailed at that time was reduced before it became effective on much tonnage. The pig iron composite is unchanged.

Scrap prices have again strengthened and the average of No. 1 heavy melting steel at Pittsburgh, Philadelphia and Chicago is 12c. higher at $13.08 a gross ton.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ended July 13, 1935	July 14, 1934	July 15, 1933	July 16, 1932
153,631	156,923	80,804	59,451	127,839	34,602



STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended June 13, 1936	July 13, 1935	July 14, 1934
Pittsburgh	63.0	67.0	66.0	30.0	18.0
Chicago	72.0	72.0	71.0	42.0	28.0
Valleys	73.0	74.0	71.0	41.0	28.0
Philadelphia	50.0	48.0	43.0	27.0	22.0
Cleveland	79.0	79.0	76.0	32.0	34.0
Buffalo	90.0	90.0	80.0	27.0	15.0
Wheeling	94.0	96.0	95.0	55.0	35.0
Southern	52.0	57.0	67.0	22.0	45.0
Ohio River	70.0	63.5	80.5	45.0	25.0
Western	75.0	80.0	80.0	20.0	20.0
St. Louis	90.0	90.0	85.5	27.0	20.0
Detroit	100.0	100.0	100.0	95.0	100.0
Eastern	90.0	90.0	85.0	30.0	25.0
Aggregate	70.0	71.5	70.0	36.5	27.0
Average Year to Date	61.4	60.9	59.9	45.6	46.8

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended July 7, 1936	June 30, 1936	June 9, 1936	July 9, 1935	Year to Date 1936	1935
Fabricated structural steel awards	44,650	36,815	15,800	17,000	586,885	413,795
Fabricated plate awards	2,530	1,670	9,470	6,225	137,830	93,580
Steel sheet piling awards	0	1,775	790	0	22,615	25,185
Reinforcing bar awards	2,675	23,350	4,265	920	197,020	126,775
Total Lettings of Construction Steel	49,855	63,610	30,325	24,145	944,350	659,335

. . . PITTSBURGH . . .

. . . Production drops to 63 per cent at Pittsburgh and to 94 per cent at Wheeling.

o o o

. . . High schedules are indicated for remainder of month.

o o o

. . . Scrap prices are advanced.

PITTSBURGH, July 7. — Producers in this district are mainly occupied in shipping material placed on the order books last month. As a result of working off these backlogs, operations in this district are at 63 per cent of capacity. This is a drop of four points from last week's figure. However, the latter was based on a five-day schedule and a better comparison is gained by considering the week before, at which time steel ingot output was at 65 per cent. The operating rate in the Wheeling district has leveled off two points to 94 per cent of capacity.

Present indications point to fairly stable production schedules during the larger part of this month, since mills will be extremely busy cleaning up last minute tonnages. While new specifications have not been coming in at the same rate as last month, bookings for certain products are showing up much better than producers had anticipated. While it is possible that some of this business is being driven in by fear of labor disturbances, part of it is accompanied with instructions for immediate shipment, indicating that some manufacturers are still working on a hand-to-mouth basis.

Demand for tubular goods and wire products continues at recent levels, and is giving a fair support to present production rates. Movement of plates and shapes is fairly active, due to the appearance of an increase in a number of projects brought in by higher prices. Although tin plate production remains at approximately 98 per cent, a continuation of the drought for two or three more weeks might possibly cause a revision in consumers' requirements.

Raw material markets continue firm, especially scrap, which has shown a rise of 12½c. Demand for beehive coke has increased sharply, due to the apparent scarcity of by-product coke.

Pig Iron

Nothing outstanding has developed in this market over the past week. Merchant furnaces in this district and vicinity continue at practical capacity operations. It is known that consumers have very little stocks on hand, since the method of buying for the past several months has been on a carload lot basis. It is expected that steel foundries will continue along their present rate of operations during this month and there is little likelihood that the aggregate demand for merchant pig iron will change much during the balance of July.

Semi-Finished Steel

Production is extremely heavy as mills attempt to clear up tonnages taken at second quarter prices. June business was at a higher level than that experienced in several years. Mill stocks have been badly depleted and even after consumers' orders have been shipped it will probably be necessary for producers to spend some time building up stocks. While some specifications at the new prices have been received, the total is small, both in tonnage and in number.

Bolts, Nuts and Rivets

Emphasis during the past week has been mainly on production, since few new specifications have materialized. Part of the situation is undoubtedly due to the holiday week-end and to the fact that many consumers had specified earlier in order to avoid to some extent higher prices. Demand from miscellaneous sources will probably be dull for the next few weeks and producers are depending on orders from car builders and fabricators.

Bars

Orders placed on the books during June showed a larger total tonnage than in any month since 1929. Mills are being taxed to capacity in order to make deliveries. From present indications, shipments will be leaving the mills far into July. Since much of the tonnage placed was for immediate consumption, pressure for deliveries is being exerted on the mills daily. Meanwhile new specifications at third quarter prices, although not large, are greater than was expected. While fear of labor disturbance has as yet not driven in any considerable tonnage, there is evidence that some customers are specifying at this time on account of this factor.

Sheet Steel Piling

Activity in this market continues at recent levels. Several large projects are pending and quite a few small jobs have been awarded. Low bidders have been announced on the Chicago River project which will take 6000 tons of piling. On the basis of a gravel fill, Frazier Davis Construction Co. and G. L. Tarlton Contracting, Inc., of St. Louis, were low bidders, while on a basis of a rock fill, Warner Construction Co. of Chicago was low bidder. It is expected that awards will be made shortly when the United States Engineering Office decides the question of which type of fill will be used.

Cold-Finished Bars

Aggregate tonnages placed on the order books during the month of June were higher than any month since 1929, and herculean efforts on the part of producers will be necessary if all material is to be shipped during July. Contrary to expectations on the part of producers, a fair amount of specifications has been received at the new prices. Sources of demand are practically the same as for those bookings placed last month. There has not, however, been enough new business as yet to test new prices.

Reinforcing Steel

Activity in this market continues at a brisk pace, with releases on specific jobs being received daily.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	July 7, 1936	June 30, 1936	June 9, 1936	July 9, 1935
Rails, heavy at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	**30.00**	28.00	28.00	27.00
Sheet bars, Pittsburgh	**30.00**	28.00	28.00	28.00
Slabs, Pittsburgh	**30.00**	28.00	28.00	27.00
Forging billets, Pittsburgh	**37.00**	35.00	35.00	32.00
Wire rods, Nos. 4 and 5, P'gh	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	**1.95**	1.85	1.85	1.80
Bars, Chicago	**2.00**	1.90	1.90	1.85
Bars, Cleveland	**2.00**	1.90	1.90	1.85
Bars, New York	**2.30**	2.20	2.20	2.15
Plates, Pittsburgh	**1.90**	1.80	1.80	1.80
Plates, Chicago	**1.95**	1.85	1.85	1.85
Plates, New York	**2.19**	2.09	2.09	2.09
Structural shapes, Pittsburgh	**1.90**	1.80	1.80	1.80
Structural shapes, Chicago	**1.95**	1.85	1.85	1.85
Structural shapes, New York	**2.16¼**	2.06¼	2.06¼	2.06¼
Cold-finished bars, Pittsburgh	**2.25**	2.10	2.10	1.95
Hot-rolled strips, Pittsburgh	1.95	1.95	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.50	2.50	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.60	2.60	2.50	2.50
Sheets, galv., No. 24, P'gh	3.20	3.20	3.10	3.10
Sheets, galv., No. 24, Gary	3.30	3.30	3.20	3.20
Hot-rolled sheets, No. 10, Pittsburgh	1.95	1.95	1.85	1.85
Hot-rolled sheets, No. 10, Gary	2.05	2.05	1.95	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.05	3.05	2.95	2.95
Cold-rolled sheets, No. 20, Gary	3.15	3.15	3.05	3.05
Wire nails, Pittsburgh	2.10	2.10	2.10	2.60
Wire nails, Chicago dist. mill	2.15	2.15	2.15	2.65
Plain wire, Pittsburgh	2.40	2.40	2.40	2.30
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.35
Barbed wire, galv., P'gh	2.60	2.60	2.60	3.00
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	3.05
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	July 7, 1936	June 30, 1936	June 9, 1936	July 9, 1935
No. 2 fdy., Philadelphia	$21.3132	$21.3132	$21.3132	$20.3132
No. 2, Valley furnace	19.50	19.50	19.50	18.50
No. 2, Southern Cin'ti	20.2007	20.2007	20.2007	19.2007
No. 2, Birmingham†	15.50	15.50	15.50	14.50
No. 2, foundry, Chicago*	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	19.8132
Basic, Valley furnace	19.00	19.00	19.00	18.00
Malleable, Chicago*	19.50	19.50	19.50	18.50
Malleable, Valley	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago	25.2528	25.2528	25.2528	24.2528
Ferromanganese, seab'd carlots	75.00	75.00	75.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivery quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	**$13.75**	$13.62½	$13.25	$11.75
Heavy melting steel, Phila.	**12.25**	12.00	12.00	10.50
Heavy melting steel, Chicago	13.25	13.25	12.75	10.00
Carwheels, Chicago	13.50	13.50	13.50	10.50
Carwheels, Philadelphia	13.75	13.75	13.75	11.25
No. 1 cast, Pittsburgh	14.75	14.75	14.75	13.25
No. 1 cast, Philadelphia	**14.25**	14.00	14.00	11.25
No. 1 cast, Ch'go (net ton)	12.00	12.00	12.00	9.00
No. 1 RR. wrot., Phila.	14.75	14.75	14.75	10.25
No. 1 RR. wrot., Ch'go (net)	11.50	11.50	11.50	8.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	*$3.50*	$3.65	$3.65	$3.25
Foundry coke, prompt	*4.00*	4.25	4.25	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Eectrolytic copper, Conn.	9.50	9.50	9.50	7.75
Lake copper, New York	9.62½	9.62½	9.62½	8.12½
Tin (Straits), New York	**42.37½**	41.00	42.50	52.37½
Zinc, East St. Louis	*4.75*	4.85	4.90	4.30
Zinc, New York	*5.12½*	5.22½	5.27½	4.67½
Lead, St. Louis	4.45	4.45	4.45	4.00
Lead, New York	4.60	4.60	4.60	4.15
Antimony (Asiatic), N. Y.	13.00	13.00	13.50	12.75

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
July 7, 1936	2.159c. a Lb.	$18.84 a Gross Ton	$13.08 a Gross Ton
One week ago	2.122c.	18.84	12.96
One month ago	2.097c.	18.84	12.67
One year ago	2.124c.	17.84	10.75
	Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1936	2.159c., July 7	2.084c., Mar. 10	$18.84, Jan. 7	$18.84, Jan. 7	$14.75, Feb. 26	$12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

New business is coming out in good volume. Possibility of increased prices during the fourth quarter is, no doubt, a factor in the placement of some of the present business.

Plates and Shapes

Activity in this market is being maintained at recent levels. Increased prices have been driving in identified projects both in the public and privately financed fields. A noticeable feature in this week's awards was the appearance of several projects involving construction of railroad bridges. This is the first of this type of construction for quite some time, and further indicates the intention of railroads to come into the market for improvements. Although public-financed projects still take the lead, nevertheless the improvement shown recently in the number of private projects appearing is holding. The American Bridge Co. has received the contract for transmission towers for TVA involving 1300 tons. Jones & Laughlin Steel Corp. will furnish 970 tons of steel to be used in constructing a factory addition to the Fisher Body Corp. at Pontiac, Mich.

Tubular Products

Movement of standard pipe has taken the spotlight in this market. Warehouses last month experienced an especially good volume of business and as a result are ordering quite heavily in order to replenish their stocks. A general improvement in building and a more noticeable increase in rehabilitation plans are responsible for the good showing in this category. The specifications for oil-country goods, if anything, are slightly below recent levels. However, this condition is considered by producers to be a temporary one.

Wire Products

Manufacturing wire bookings are holding at recent levels. The improvement noticeable during the past several weeks in the merchant wire business is persisting and there are no immediate signs of a let-up. Incidentally, this improvement exceeded the expectations of producers and indicated a better than usual movement from jobbers' stocks to the trade.

Sheets

Sheet production continues at recent levels, with mill backlogs being slowly worked off. It will undoubtedly be at least the middle of July before second quarter tonnage has been moved. Although new specifications already received at third quarter prices have not been at the rate prevalent last month, nevertheless they have been larger in number than producers anticipated. Among the consumers ordering this month have been refrigerator and implement manufacturers. Fear of possible labor disturbance and a desire to have stock on hand have been factors in bringing in this new business.

Tin Plate

Tin plate operations remain at 95 to 98 per cent. There has been no change in the market picture over the past two weeks, with a possible exception that drought conditions in the West, should they continue for a few weeks longer, will affect the future operations in the tin plate business. From a crop standpoint, the drought conditions are spotty; however, packers feel that unless some of these regions enjoy a rainfall within the next two weeks their requirements may be subject to revision.

Strip Steel

Producers are bending every effort toward clearing their mills of second quarter-priced business, with the result that production is being maintained at recent levels. While new specifications are rather small in number compared to last month's business, nevertheless the same situation exists here as in the sheet market. In other words, the amount of new orders is beyond the expectations of producers, and in some cases immediate shipment is desired, indicating, possibly, that some consumers, in their attempt to anticipate their needs, estimated short of actual requirements.

Coal and Coke

Demand for furnace coke is at a high level, with merchant by-product producers working at practical capacity. As pointed out several weeks ago, some producers who fill the needs of domestic users have found themselves unable to build up accumulations for next fall's domestic trade. As a result, inquiries for beehive coke have stepped up sharply during the past few weeks. Beehive coke dealers in this district are receiving inquiries from various parts of the country asking for quotations on domestic and foundry sizes. While this situation does not presage any general return to beehive coke production, it does indicate a temporary flurry in the production of this type of coke. Merchant by-product coke producers and steel companies which have built up a domestic market over the past few years are reluctant to let this go, hence where an immediate accumulation of by-product coke is impossible, they are ordering beehive coke to make up the deficiency. Movement of coal to the Lake from this district has increased sharply during the past week, due entirely to the reduction in freight rates effective July 1. The movement is near normal now and will probably continue at this rate during the balance of the season.

CANADA

. . . Steel demand tapers in Canada.

o o o

. . . Pig iron output at 47 per cent of capacity.

TORONTO, June 30.—While there has been minor tapering off in business in the Canadian iron and steel markets as a result of the summer holiday season, sales in most lines are running well ahead of last year. Companies producing cars and locomotives are maintaining active operations on old contracts and it is expected that by the time these have been cleaned up additional orders will be placed.

The automotive industry continues to take steel, and there is a good call for casting, sheets, etc. Electric stove and refrigerator firms also are maintaining a good demand for raw materials. The mining industry is one of the heavy buyers of steel, tools and machinery at this time and several good orders are pending for mill equipment. Building trades have shown minor improvement and odd-lot sales are reported for structural steel and reinforcing bars. General business, however, is somewhat below that of a month or six weeks ago, but continues well ahead of last year.

In the merchant pig iron market sales are holding around 1000 tons per week. They are made up of spot orders from 50 to 300 tons. While melters have not placed contracts for third quarter delivery, it is stated that a few have issued inquiries and bookings on this account are expected to materialize in the immediate future. Some melters have taken lots up to 300 tons to carry them along for the next month or two, but the majority adhere to hand-to-mouth buying and order in one or two-car lots. The daily melt continues better than 50 per cent, but officials of various companies do not look for further direct improvement until about the middle of September. Pig iron production, with four stacks blowing, is holding around 58,000 tons monthly or about 47 per cent of all blast furnace capacity in Canada. Imports continue small and are confined to special grades from the United States. Prices are firm and unchanged.

. . . . CHICAGO . . . .

. . . Steel production recovers from holiday curtailment.

o o o

. . . Drought conditions are only depressing factor in market.

o o o

. . . Farm implement output to be stepped up in August.

CHICAGO, July 7.—Ingot output has snapped back to the pre-holiday rate and now stands at 72 per cent of capacity near which figure it promises to remain unless labor trouble intervenes. Unionization of steel mills is in the very early stages, but the subject is alive in the minds of consumers and there is a jittery note to the market on this account.

Insofar as mill books are concerned there is nothing to worry about. Deliveries are still backward in many lines and the rush of last minute business as June came to a close served to add weight to the view that second quarter deliveries will extend well into August. A review of opinion as to the extent of speculative tonnages taken at second quarter prices indicates that speculations were not rife merely on the score that users wanted to accumulate steel against unforeseen needs but rather that the bulk of orders were placed to cover commitments on consumers' books.

Drought continues to stand as a spectre throughout much of the West and Northwest, but in the face of this farm implement manufacturers contend that fall manufacturing schedules will be started in August. For one thing they have an improved export trade to help production lines. One effect of the drought is that the Northern Pacific, which had been planning on placing rails is now backing away from that idea.

The scrap market is more active, especially in foundry grades, demand for which is better rounded now that steel foundries are enjoying volume business as the result of railroad buying. Heavy melting steel is firm at current quotations, support coming from high priced railroad scrap which is appearing on track and forcing the hands of brokers.

Pig Iron

July shipments are indicating a moderate decline from the June rate. However, sellers, as a result of their contacts with melters, have come to the conclusion that as matters now stand July shipments can be expected to approximate May, which will provide a good summer month.

Rails

Of the 20,000 tons ordered by the Chesapeake & Ohio, 8620 tons will be rolled by the Chicago mills of Carnegie-Illinois and 6800 tons by Inland steel. About 10,000 tons of track supplies to accompany the Chesapeake & Ohio rails is expected to be purchased in the near future. The Great Northern, one of the few railroads that has not taken 1936 rails, is backing away from buying because of the seriousness of the drought in its territory. Frog and switch manufacturers have placed orders for an aggregate of 3000 tons of rails. Miscellaneous track accessory business is dull and there are no indications of a change in the near future.

Semi-Finished Steel

New business taken at the close of June was exceptionally heavy. Non-integrated mills made large commitments and railroad equipment, axle manufacturers and heavy forgers made liberal purchases.

Plates

New developments in this market are scarce except in the case of 500 gondolas ordered by the Northern Pacific from Pressed Steel Car Co. This railroad will build 250 flat cars in its own shops. The Cotton Belt may come into the market for cars and locomotives. Contract car shops, and the Burlington and the Milwaukee Roads are taking steel for car programs, but the peak of releases for this type of work has not been reached. Sellers east of Chicago are talking about two unidentified pipe lines which will take 15,000 tons of steel.

Bars

New business up until the close of second quarter books was exceptionally heavy and backlogs are well filled with tonnages that will be delivered in July and August. Automobile use is still high and there is some talk that 1937 models may be delayed at some plants because of the rush to meet demands for current models. Tractor plants are a shade less busy and farm implements are in lower production, both conditions being attributed to the failure of recent rains to check crop damage. In fact, continued heat and drought through most of the Great Plains area is threatening national calamity.

Structural Material

An extremely interesting phase of this market is the release of business by the railroads. The Santa Fe, the Milwaukee Road and the Burlington have ordered bridges totaling 1800 tons and 1025 tons will be used for railroad bridges in Wisconsin. The United States Engineer's Office at Rock Island, Ill., has issued a list of Mississippi River improvements over and above those on which plans have already been submitted for bids. Among these are dams at Saverton, Mo.; Le Claire, Iowa, and Clinton, Iowa, and clearing pools at Guttenberg, Dubuque, Muscatine and Burlington, Iowa. New awards are light but there is a good volume of inquiry represented by state highway bridge work.

Wire Products

Demand is not seriously hurt by the drought, but sellers are expecting next week's reports from district offices to show that the pinch is on. Meanwhile operations stand at 70 per cent of capacity with no change in the rate at which manufacturing lines are moving. Current sales are exceptionally good and no valid explanation can be advanced unless users, foreseeing the possibility of labor strife, want

additional wire tonnages, not necessarily on a speculative basis, but to assure delivery dates on orders now at hand.

Sheets

Mills are operating at full capacity, but the character of demand is slowly changing. Some units now find themselves able to take on additional automobile sheet business, a condition which has not prevailed for months. Galvanized sheets are moving in good summer volume, but the rate is not expected to hold in view of the drought.

Reinforcing Bars

Of special interest in this market is revival of plans for the resumption of apartment construction, which previous to 1930 brought many large tonnages to shops. Plans are well advanced on one new project and several buildings which now stand as reinforced concrete skeletons may soon be completed. New awards are not impressive but in recent days bids have been opened on a number of large projects which should turn into bar orders within two to three weeks. The price situation is somewhat clouded for the reason that there are still quotations outstanding which were made before the move to publish prices.

Warehouse Business

Warehouse lists are being changed in order to conform with advances on mill base prices and the numerous revisions in the mill card of extras for size and quantity. Extras heretofore charged for forging quality on round bars have been eliminated resulting in some reduction in the base price for this quality. Changes are not being made in either quantity or size extras on hot-rolled and cold-finished alloy steel.

. . . Awards of 2675 tons —4300 tons in new projects.

AWARDS

State of Indiana, 250 tons, bridge, to Concrete Steel Co.

Chicago, 500 tons, Fleischman Malting Co., to Joseph T. Ryerson & Son.

Baldwin Park, Cal., 100 tons, auditorium at Central school, to Blue Diamond Corp.

Los Angeles, 100 tons, building at Tenth Avenue school, to Blue Diamond Corp.

Los Angeles, 190 tons, shop building at Belmont high school, to Soule Steel Co.

Los Angeles, 100 tons, gymnasium at Hamilton school, to Blue Diamond Corp.

Los Angeles, 100 tons, auditorium at Western Avenue school, to Consolidated Steel Corp.

Los Angeles, 100 tons, auditorium at Sixth Avenue school, to an unnamed bidder.

Huntington Park, Cal., 150 tons, high school auditorium, to Blue Diamond Corp.

Los Angeles, 100 tons, auditorium at Miramonte Avenue school, to Consolidated Steel Corp.

Los Angeles, 100 tons, Auditorium at Sixty-first Street school, to Consolidated Steel Corp.

Niles, Cal., 432 tons, six State undercrossing and one bridge, to Truscon Steel Co.

Hickam Field, T. H., 312 tons, four double hangars at Army air field, to Concrete Engineering Co.

Denver, 121 tons, extension to city water system, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Saugus, Mass., 250 tons, grade crossing.

Arlington, Mass., 125 tons, reservoir.

New York, 510 tons, Treasury Department; bids July 20.

Peoria, Ill., 500 tons, building for Hiram Walker.

Cairo, Ill., 630 tons, bridge across Ohio River; 430 tons for substructure, Missouri Valley Bridge & Iron Co., low bidder; 200 tons for superstructure, Central Engineering Co., Davenport, Iowa, low bidder.

Fort Smith, Ark., 225 tons, post office and court house; J. I. Barnes, Springfield, Mo., low bidder on general contract.

San Francisco, 120 tons, Alemany Boulevard sewer extension No. D-1; bids opened July 8.

Beverly Hills, Cal., 250 tons, alterations on high school; bids opened.

Los Angeles, 150 tons, alterations on Breed Street school; bids opened.

Los Angeles, 100 tons, alterations on Griffith Avenue school; bids opened.

San Fernando, Cal., 100 tons, school auditorium; bids opened.

Santa Ana, Cal., 200 tons, high school building; bids opened.

Los Angeles, 150 tons, auditorium at Commonwealth school; bids opened.

Los Angeles, 100 tons, alterations on Woodcrest school; bids opened.

Los Angeles, 100 tons, alterations on Chermoya Avenue school; bids opened.

South Gate, Cal., 100 tons, auditorium at Liberty Boulevard school; bids opened.

Los Angeles, 250 tons, alterations on Belveder junior high school; bids opened.

Los Angeles, 100 tons, shop building at Polytechnic high school; general contract awarded.

Los Angeles, 250 tons, alterations on First Street school; bids opened.

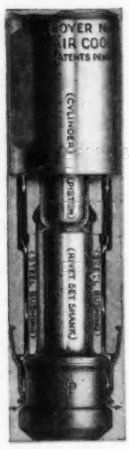
Venice, Cal., 200 tons, building at Venice high school; bids opened.

Santa Barbara, Cal., 100 tons, school auditorium; bids opened.

Riveting Hammers Are Air Cooled

BOYER riveting hammers featuring air cooling, one effect of which is reduction in rivet set breakage, have been brought out by the Chicago Pneumatic Tool Co., 4 East Forty-fourth Street, New York.

Four ports carry the cooling currents of exhaust air down the length of the cylinder to its nose end and out past the rivet set head.



Where they parallel the rivet set shank, these ports are formed by the inner wall of the cylinder and the grooves in a hardened steel bushing. The four cooling ports are open where the nose end of the cylinder meets the base of the rivet set head.

The cooled rivet set is said not only to reduce set breakage but also to permit more rivets to be driven before a change of sets is necessary. By cooling the nose end of the hammer, excessive heat is eliminated at the usual "hot spot" point; and the hammer can be handled continuously without discomfort. Longer cylinder life is attributed to means provided for compensating for nose-end wear. A feature of the new hammer is a removable hardened steel cylinder bushing; a higher degree of hardness on the internal nose end is said to be made possible with the removable bushing, this harder wearing surface markedly increasing the life of the set end of the cylinder. With the entire length of the cylinder air cooled, transfer of heat to all other parts of the hammer is correspondingly reduced.

Intermountain Belting & Packing Co. has been appointed agent for the Lincoln Electric Co., Cleveland, in Colorado, part of Kansas, Nebraska and Wyoming. Salesroom is located at 1414 Wazee Street, Denver. J. H. Johnson is president of the Intermountain company, M. H. Mickey is vice-president and J. I. Creighton, secretary-treasurer.

. . . CLEVELAND . . .

. . . Steel output maintained at 79 per cent of capacity.

o o o

. . . Consuming industries are using steel as fast as it is shipped to them.

o o o

. . . Chesapeake & Ohio orders 20,000 tons of rails.

CLEVELAND, July 7.—Steel works operation in the Cleveland-Lorain district rebounded this week to 79 per cent of ingot capacity, the production rate maintained before the holiday shutdown. With order books well filled, producers seem intent on maintaining high production schedules until the steel bought last month is rolled and shipped.

Local sheet and strip mills are continuing full operating schedules. Some mills will be cleaned up on old orders for some of their products by July 15, but shipments of some products will not be completed until around the end of the month. Mills, however, plan to have all their old orders filled by Aug. 1.

With the uptrend in business this year, miscellaneous demand for steel has increased to a larger extent than demand from the motor car industry. This statement, based on figures of a leading producer, indicates that the percentage of the total steel produced taken by the motor car industry during the first six months was less than during the same period last year.

New demand, as was to be expected, took a sharp drop with the closing of books June 30 at the old prices on the products on which price advances had been announced for the third quarter. Structural shapes, however, have continued quite active with considerable tonnage placed for identified projects for which mills had granted protection. Miscellaneous demand for sheets also has been remarkably good, considerable tonnage covering nearly all grades having been booked during the week at the new prices. With mills congested there is some pressure for deliveries, particularly of sheets.

The new prices are meeting little resistance. The $2 a ton advance on steel bars has been tested by the sale of a few 1000-ton lots at the new price.

Operations of most consuming industries are being maintained at recent schedules which indicates that much of the steel that is now being delivered will go into production shortly. As a buyer of steel the automotive industry continues inactive.

The Chesapeake & Ohio has divided its 20,000-ton rail order between three producers and has placed accessories for these rails. Accessories for the 1000 hopper cars purchased by the Wheeling & Lake Erie railroad were also placed during the week.

Pig Iron

Placing of contracts for the third quarter has subsided following an active month of buying during which furnaces accumulated good backlogs. Most consumers who do forward buying are now under cover. Consumers generally have placed orders for more extended requirements than they did for the second quarter. This indicates that spot shipment sales during the current quarter will be far less numerous than during the last quarter. Independent foundries making automobile castings have curtailed production to a greater extent than foundries operated by the motor car companies. One of the automobile foundries is scheduled for full operations until Aug. 15. Demand for iron from implement foundries has dropped, but it continues good from tractor plants.

Sheets

Sales since July 1 at the new price have exceeded expectations. Some of the mills have booked considerable tonnage of all grades in lots ranging from carloads to 100 tons at the new prices. Black, galvanized and enameling sheets have been the most active. Demand is widely diversified, coming from nearly all sources except the automotive industry and jobbers. Increase in residential building is stimulating the business of manufacturers of building material and is expected to help sales of refrigerators, washing machines and other household equipment. Shipments against orders taken at the second quarter prices will drag along until near the end of the month.

Strip Steel

New orders for sizable lots of cold strip were placed during the week by some of the automobile parts manufacturers. Hot strip is quiet, little business having been taken at the advanced prices. Mills have not carried over much of a backlog from June.

Bars, Plates and Shapes

A few small-lot sales of steel bars have been made at the third quarter price. New demand is expected to be light through this month as most consumers are covered for their early requirements, and forge shops and other plants making automobile parts have slowed down. Structural steel is quite active in the closing of orders for material for specific projects. This week's awards are confined to two jobs taking 500 tons.

The Ohio State Highway Department has an inquiry out for a bridge in Ironton, requiring 550 tons. Plate mills have a good backlog of orders accumulated last month.

Iron Ore

Water shipments of Lake Superior ore during June amounted to 6,608,320 tons, an increase of 2,366,684 tons, or a gain of 55.80 per cent over June last year. The June movement showed a gain of 1,558,576 tons over May. Total shipments until July 1 were 11,677,510 tons, a gain of 3,532,017 tons, or 43.36 per cent over the corresponding period a year ago.

..GREAT BRITAIN..

. . . No signs of usual seasonal decline seen in British industry.

o o o

. . . Semi-finished makers hard pressed to meet demand.

o o o

. . . Need for pig iron is being relieved slightly.

LONDON, July 6 (*By Cable*).—The pig iron shortage has been appreciably relieved by increased production, but demand remains heavy and makers are still reluctant to accept new business.

No signs of the usual seasonal decline in steel trade activity have been noticed. Motor car, building, ship building and engineering industries remain busy and armament orders are necessitating further plant extensions. Consumption for the second half of 1936 is likely to exceed the record figure for the first half. Stringency of demand for semi-finished steel is accentuated by recent Continental labor troubles and British works are hard pressed. Bookings of heavy steel are brisk despite higher prices. Home business in sheets and strip is good. Export business has improved in rails and sheets.

Tin plate business is moderate but output is being maintained at a good level. Two of the works of the Richard Thomas group recommenced operations this week.

Export improvement in Continental iron and steel is only slight and further expansion is expected as the fear of higher prices has resulted in increased inquiries.

United Kingdom prices for certain products have advanced in accordance with the recent advance in British home prices.

Japan has declined membership in the Interntional Steel Cartel on the pretext that Japanese production is still inadequate for home needs.

....ST. LOUIS....

. . . Strike scare stimulates steel buying.

o o o

. . . Production at 70 per cent.

ST. LOUIS, July 7.—The volume of business in finished iron and steel placed with the mills during June was unusually heavy and brisk trade has continued since. The heavy buying was due to a desire to cover before price advances of $2 a ton became effective on July 1, and since then orders have been greatly stimulated by fears that a strike may develop in the iron and steel industry. Those in the structural field are said to be especially concerned by the possibilities of a strike. Warehouse prices have been advanced in line with mills' advances.

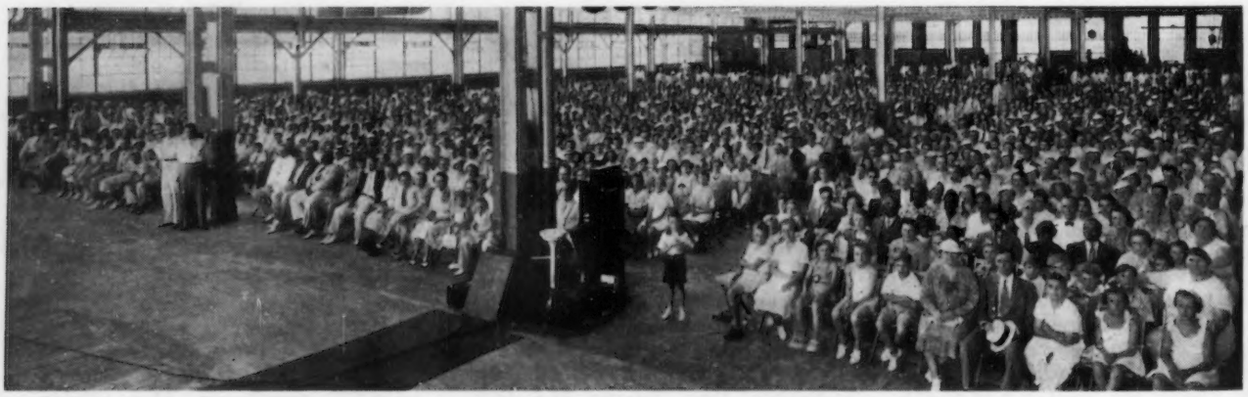
The Southern Pacific has ordered 250 freight cars from the Mount Vernon Car Co. and 25 from the St. Louis Car Co.

Bids were opened July 2 for penitentiary units at Jefferson City, Mo., requiring 900 tons of structural steel. Boyle-Pryor Construction Co., Kansas City, was low on a combination of all projects, and Kellerman Contracting Co., St. Louis, and S. Patti Construction Co., Kansas City, were low on separate bids. Bids are due July 24 for reconstruction of the deck of the Kings Highway bridge over the Wabash Railroad here, requiring 135 tons of shapes.

For the bridge across the Ohio River at Cairo, Ill., 430 tons of reinforcing bars will be required for the substructure (Missouri Valley Bridge & Iron Co., low bidder) and 200 tons for the superstructure (Central Engineering Co., low bidder). J. I. Barnes, Springfield, Mo., is low bidder on the post office and court house at Fort Smith, Ark., calling for 225 tons of reinforcing bars.

Shipments of pig iron during June were 10 to 15 per cent ahead of May. Implement interests which generally slow down early in June went full speed through to July 1. Since then there has been a slight let-up for inventory, and they will not get back to a high rate of production for the next five or six weeks. The tractor industry is spotty. Two plants report some recession and a third is on full schedule. The malleable business is picking up. Stove foundries are expected to get going on their fall models shortly.

Ingot operations in the St. Louis territory are at 70 per cent of capacity.



Some of the 11,000 employees, friends and visitors at the Cincinnati Milling Machine Co. housewarming, June 28. (Account of housewarming on Page 96.)

. . . . NEW YORK. . . .

. . . Demand for heavy steel products is well maintained.

o o o

. . . Consumers urge shipments in anticipation of labor trouble.

o o o

. . . Railroad buying continues as market factor.

NEW YORK, July 7.—The beginning of the new quarter did not bring the lull that was expected in the steel market here. While orders for the light steel products since the first of the month have been confined to small lots for immediate consumption, local sales offices are still very busy closing contracts on heavy hot-rolled material. This activity is likely to continue during the greater part of the month as buyers of steel for identified structures are given 30 days to close contracts on which they have obtained protection.

Continued purchasing interest on the part of the railroads is surprising to many steel sellers. The Chesapeake & Ohio has placed 20,000 tons of rails and the New York Central has bought 5,500 tons with accompanying accessories. The Lehigh & New England is in the market for 250 hopper cars and the Maine Central is considering the purchase of 800 freight cars and three locomotives.

Anticipation of labor trouble is not yet an important market factor in this district, although many consumers are sounding out their sources of supply with regard to prospects. Some users are urging immediate shipment of material already on order, but deliveries of flat-rolled products are so far in arrears that they are often disappointed.

While demand for tin plate is well sustained the can companies are seriously concerned with drought reports from the West. It is believed, however, that the affected areas are not productive of extensive canning crops.

Third quarter prices are now well established on all products and the market has the most stabilized tone since the passing of the NRA.

Pig Iron

Orders taken by sellers in this district were given a vigorous boost last week by one or two unusually large commitments. Aggregate sales probably totaled in excess of 9000 tons. The business was not generally distributed, however, as a number of sellers reported that the holiday interfered with the market to some extent. Identification of contracts placed is difficult, but individual orders ranged from carload to 500-ton lots. Both spot and forward positions were embraced. A single inquiry, heretofore reported as involving about 1500 tons of foundry and malleable grade, was distributed among several selling interests. A number of foundries curtailed operations last week in deference to the national holiday, but are resuming previous schedules this week.

Reinforcing Steel

The market this week is more quiet following last week's spurt under the stimulus of inquiries for a number of large tonnages. The only job reported pending last week which has been settled is 750 tons of bars for the substructure of the bridge in Brooklyn for the Marine Parkway Authority, which went to Jones & Laughlin Steel Service, Inc. The others are all awaiting final settlement. Bids will be opened July 20 on about 550 tons of bars for work on New Jersey highways. The low bid on 800 tons of reinforcing to be awarded through the New York division of the Treasury Department has been reported as being from $6 to $8 under the market. From past quotations on public jobs it would seem that this figure is quite common on such work, although private lettings adhere more closely to the base prices.

Cast Iron Pipe

Lack of funds is chiefly responsible for continued lethargy in cast iron pipe in this district. Municipalities are not buying, and, in fact, there has been little activity apparent since the Treasury stopped its purchases some four to five months ago. Occasional small commitments for less than 100-ton lots are about all that the trade is good for at present. One to two-carload orders are rare, and represent comparatively large tonnages on the books of sellers accustomed to prolonged market idleness.

. . . BOSTON. . .

. . . New England industrial activity well ahead of 1935.

o o o

. . . Pig iron sales light.

BOSTON, July 7.—Pig iron sales were few and far between last week. However, consumption held up, and some melters should be in the market for iron before the close of the month. The foundry industry generally is in a much more favorable position than a year ago, with every indication of further improvement that should reach new 1936 high levels during the last quarter.

With cotton and woolen forging ahead, New England's industrial index is a few points higher than a week ago. The one disturbing factor is the taxation program put through in the final days of the last Congress. It is believed here that many small industries will crack under the tax burden, and that large companies can meet the situation. Machine tool builders are not as busy as they were a month ago.

Although individual orders are small, steel warehouses are moving a sizable aggregate tonnage each week. Some adjustment in prices will be made before long. Steel fabricators expect more rather than less business, and the movement of reinforcing steel bars is slowly expanding.

....BUFFALO....

... Steel output well maintained.

o o o

... Pig iron demand remains steady.

BUFFALO, July 7.—Open-hearth operations at Bethlehem's Lackawanna plant are at almost full capacity, with from 22 to 23 units active. Republic Steel Corp. is operating seven furnaces with a strong possibility of eight being on by the middle of this week. Wickwire-Spencer corporation is keeping up its operation of two open hearths.

Steel works have passed July 1 at almost top speed. This was expected to be the date on which they might taper off, but apparently the atmosphere of tension in labor relations is having the effect of maintaining production with a view of billet storage.

A Buffalo concern will fabricate 450 tons for the Carborundum Co. addition at Niagara Falls, N. Y., and bids will be opened July 14 for a 450-ton highway bridge in Orleans County. Fabricating shops, both structural and reinforcing bar, continue very busy on the less than 100-ton lots.

Pig iron business is good with very satisfactory tonnage being booked. Frequently this runs into four figures and the small-lot demand is constant.

..BIRMINGHAM..

... Another sheet furnace blown out.

o o o

... Steel demand well maintained.

BIRMINGHAM, July 7.—The Tennessee Coal, Iron and Railroad Co. blew out Ensley blast furnace No. 6 on June 30, reducing the district's active total to 10. This is a loss of two blast furnaces since the close of the Ensley rail mill on June 24. There will also be a reduction of one open-hearth furnace this week. The Tennessee company will take off one unit at Fairfield, leaving five in operation. Three will continue at Ensley, while the Gulf States Steel Co. also continues four at Gadsden, making a total of 12 this week, as compared with 13 last week and 15 three weeks ago.

Steel bookings are still flowing in at a satisfactory rate, with plates, shapes and bars on an active basis. Last week there was also a pick-up in wire products demand.

Only a fair volume of third quarter pig iron tonnage has been booked to date. Melters have been slow in making new commitments because of stocks on hand or a tendency to buy for the time being only as needed.

The Bessemer plant of the Pullman-Standard Car Mfg. Co. can now look forward to steady operations for some time to come, with 100 phosphate cars from the Seaboard Air Line, 500 box cars from the Southern Pacific and 200 coal cars from the Central of Georgia.

Birmingham opened bids Tuesday on approximately 10,000 tons of 60-in steel pipe for its industrial water supply system.

Virginia Bridge Co. is to furnish 450 tons for a bridge in Louisiana.

Pressure pipe bookings and shipments have declined. Plant operations are about the same, but some of the production is being stocked.

RAILROAD BUYING

Maine Central is in the market for three mountain type 4-8-2 locomotives, 500 40-ton box cars, 150 50-ton gondola cars and 150 70-ton hopper cars.

Lehigh & New England is inquiring for 250 50-ton hopper cars.

Southern Pacific has ordered 250 freight cars from Mount Vernon Car Co., 25 freight cars from St. Louis Car Co. and 24 lightweight passenger cars from Pullman-Standard Car Mfg. Co.

Richmond, Fredericksburg & Potomac is inquiring for five locomotives.

General Chemical Co., New York, has ordered three 50-ton lead-lined tank cars from American Car & Foundry Co.

Standard Oil of New Jersey has ordered 10 tank cars from General American Tank Car Corp.

Guavaquil & Quito, Ecuador, have ordered 50 narrow-gage box cars from American Car & Foundry Co.

Northern Pacific has placed 500 gondola cars with Pressed Steel Car Co. and will build 250 flat cars in its own shops.

RAILS AND TRACK SUPPLIES

Chesapeake & Ohio has placed 2000 tons of rails with Bethlehem Steel Co., 11,200 tons with Carnegie-Illinois Steel Corp. and 6800 tons with Inland Steel Co.

New York Central has purchased 5500 tons of rails from unnamed companies.

...CINCINNATI...

... Seasonal influences curtail new business.

o o o

... Bookings are well below rolling schedules.

CINCINNATI, July 7. — While steel mill operations are high, seasonal influences are curtailing new business. A substantial portion of current production is for application against contracts placed before July 1, which business is estimated to require present rolling schedules for another two weeks. Bookings last week were at about 60 per cent of capacity. A small part of the reduction is attributable to the holiday, but mill interests indicate that usual warm weather pressure is obvious on current demand. Automobile companies are in the market for sheets at a fair rate, while miscellaneous demand is good.

Holiday influence retarded pig iron business last week, total tonnages having been slightly under the preceding period. Shipments also were lighter, but furnace interests indicate this to be a passing situation. On daily averages, sales were about the same as the market averages previously. Foundry operations are resisting the usual seasonal influences, production being held at about 60 per cent of capacity. This is below the peak of a few weeks ago, but better than was anticipated for the summer months. Machine tool melters are curtailing operations in response to lighter demand. Heating, automobile, pipe and valve melters, however, report steadily good business with prospects equally optimistic.

Steel jobbers closed June books with demand at a higher level than in May. July business is being watched to gage effect of higher prices which became effective July 1.

Firth-Sterling Steel Co., McKeesport, Pa., has let contract to Rust Engineering Co., Pittsburgh, for new building to be constructed adjacent to present plant. The new plant will be equipped with a dust removal system and tungsten carbide products will be manufactured.

. . PHILADELPHIA . .

. . . Production stepped up to 50 per cent.

o o o

. . . Third quarter prices are established by consumer buying.

o o o

. . . Scrap prices are advanced.

PHILADELPHIA, July 7.—The Fourth of July holiday shutdown of mills and steelworks has been followed by a step-up in operations which have been increased two points to 50 per cent of open-hearth capacity. While one plant has taken off one furnace temporarily several have been added in order to meet raw steel requirements necessary to speed up rollings on heavy second quarter specifications. There also has been a fair amount of new buying in general lines at the advanced third quarter prices. Only in few instances was there any resistance to the higher levels which have become well established.

There is no indication of speculative buying. Consumers are urging deliveries as soon as possible but in some lines, particularly sheets and strips, schedules are from two to five weeks behind, while shipments of plates are promised in one to two weeks. Warehouses were active in closing on second quarter specifications for the purpose of building up inventories, some of which had become very low. There likewise is a moderately stimulated demand from railroads for repair work.

The labor situation has created some concern on the part of buyers. Some have asked mills whether they should buy ahead on this account but are being advised to use their own judgment. So far forward buying traceable to the labor situation is light. Makers of machinery, electrical equipment and radios are buying large quantities of cold-finished steel bars.

Barring labor trouble the present rate of operations promises definitely to be well maintained if not increased during July and perhaps well into August.

Warehouse prices for general lines have been advanced $2 to $3 per ton. Scrap also is stronger with an increase of 50c. per ton in several grades, including No. 1 heavy melting steel.

Fabricators report more activity in actual new business and estimates. A number of shipbuilding contracts which are pending are expected to be placed soon now that the new merchant marine act has been passed.

Pig Iron

June shipments of pig iron were the largest since last October. While demand is not heavy, it is substantial, with a mild increase noted in the melt. The greatest demand is for foundry grades, with malleable grades almost equally as strong. Steel making iron grades are only in small demand. Prices are unchanged and steady but complaint is being made by domestic producers of imported iron prices. Some of the tonnage from abroad is reported to be selling at 50c. to $1.50 per ton under the domestic grades but generally is not up to the standard quality of the latter.

Sheets and Strips

Mills are heavily engaged on second quarter specifications for sheets of diversified grades and schedules call for deliveries in three to five weeks. Consumers are pressing for early shipment, with virtually no request for holding up orders. Demand for strip steel, both hot and cold, is good. The outstanding demand for both sheets and cold-rolled strips comes from the automotive industry but other buyers are almost as active. Jobbers specifying at the close of the second quarter was especially heavy, with urgent demand for quick delivery. The season for radio purchases of strip steel is at hand as is reflected by rising demand from that field.

Plates, Shapes and Bars

Good sized specifications were placed for plates, structural shapes and merchant steel bars during the second quarter and came from miscellaneous buyers. While third quarter orders so far have not been large, they have established the higher prices to which all mills are adhering in the face of some resistance. There has been a noticeable recovery in the demand for merchant steel bars, one maker reporting that it is the largest since 1929. Structural awards have increased somewhat. The largest award of the past weeks was for 1800 tons for the Keebler-Wyle building in Philadelphia, which went to the Bethlehem Steel Co. There has also been a mild improvement in the market for reinforcing concrete steel bars.

Warehouse Business

Effective July 1, warehouses made advances of $2 to $3 per ton for general lines and report that prices are holding up well with a good demand. Buying is of a broad character with a slight let-up in demand for structural material.

Imports

The following iron and steel imports were received here last week: 736 tons of pig iron from the Netherlands; 502 tons of spigeleisen from Soviet Russia; 58 tons of beryllium ore from Argentina; 13 tons of steel forgings, 70 tons of steel tubes, 59 tons of CDS wire, 10 tons of steel billets and 37 tons of steel bars from Sweden; 19 tons of steel bars and 6 tons of structural shapes from Germany.

. . SAN FRANCISCO . .

. . . Plate lettings show largest first half gain.

o o o

. . . Much large work still in prospect.

SAN FRANCISCO, July 7.—Lettings of steel plates, increasing threefold, showed the greatest per cent of gain during the first half of 1936 over the same period in 1935 than any other class of finished steel. Plate awards aggre-

gated 92,981 tons this half against 22,026 tons in the previous one. Reinforcing bar bookings increased from 69,144 tons to 138,092 tons, a gain of about 48 per cent. Approximately 104,983 tons of structural steel was placed during the first half this year against 52,741 tons in the same space of time in 1935.

Cast-iron pipe lettings have constantly trailed this year right up to the last week when the Los Angeles Department of Water and Power let contracts for 13,610 tons, which brought the total for the first six months of 1936 up to 26,747 tons, which is a 15 per cent gain over the corresponding total of 21,536 tons for 1935.

Looking back over awards in the last six months, it is evident that the Metropolitan Water District at Los Angeles and the Federal Government, through the Bureau of Reclamation and the United States Engineers, were in large part responsible for the excellent gains made in steel tonnage placements. The activity of school alterations and additions in southern California accounted for a great number of smaller lettings. But undoubtedly the most healthy and satisfactory gain was from the increase in industrial construction and production.

Looking forward to the last six months of the year, huge Federal projects are in the offing, such as the floating drydock which is estimated to require approximately 43,000 tons of steel. Construction of exposition buildings on Yerba Buena Shoals in San Francisco Bay, flood control plans in Los Angeles and most important, start on various units of the Central Valleys project, are all to come. Business demand may be expected to improve even farther.

Lettings during the past week were featured by three structural awards which accounted for 8500 tons. Judson-Pacific Co. will furnish 1500 tons of shapes for two hangar buildings on Yerba Buena Shoals, while Moore Dry Dock Co. will place 3500 tons in the Illinois-Pacific Glass Co. plant at Oakland, Cal. Over at Hickam Field, T. H., 3500 tons of structural steel for four double hangars will be supplied by Bethlehem Steel Co.

Of the 1867 tons of reinforcing bars placed during the week 1050 tons was for school work in southern California of which Blue Diamond Corp. accounted for 450 tons. Bids have been opened on other school jobs in this territory which will require about 2300 tons of bars.

Mill production is understood to have decreased slightly but is still far ahead of its normal seasonal rate. An immediate decrease in scrap prices is anticipated. Warehouse business in San Francisco continues to be tied up by organization strikes. Those who know realize that the present difficulty is merely a forewarning of the trouble which may be expected in September. This may be far more serious than that experienced on the dock strike two years ago.

Metropolitan Water District, 306 West Third Street, Los Angeles, asks bids until July 30 for 4.42 miles of steel pipe, 10 ft. 3-in. diameter (alternate bids on precast concrete pipe, 9 ft. 8-in. diameter) for upper feeder of Colorado River Aqueduct distribution system. F. E. Weymouth is general manager and chief engineer (Specifications No. 154).

Pacific Gas & Electric Co., 245 Market Street, San Francisco, plans about 2½ miles of 16-in. welded steel pipe for natural gas transmission in vicinity of Sacramento, Cal.

Kansas Pipe Line & Gas Co., Blue Hill, Neb., plans 2-in. welded steel pipe line from Blue Hill to Lawrence, Neb., for natural gas transmission. Right of way is being secured.

United States Engineer Office, First District, New York, closes bids July 14 for 15 steel suction pipes, 19½-in. inside diameter, 15 ft. long; six steel suction pipes, 19 ft. long; 32 new cast steel or forged steel flanges and six used flanges (Circular 502).

Humble Pipe Line Co., Humble Building, Houston, Tex., a subsidiary of Humble Oil & Refining Co., same address, is acquiring right of way for new welded steel pipe line from Talco, Tex., oil field district to Mexia, Tex., about 140 miles, and will extend line from last noted point to Longview, Tex., where connection will be made with present trunk line to Houston ship channel area, Houston, Tex. New line will be used for crude oil transmission. Early construction is planned. Cost close to $5,000,000, including steel pipe line gathering system in oil field district.

Stanolind Pipe Line Co., Tulsa, Okla., plans 8-in. welded steel pipe line in Glen Ellen Street, Oklahoma City, Okla., for oil transmission, totaling about 6500 ft.

Sheridan, Wyo., D. A. Ruff, city clerk, closes bids July 17 for 1320 ft. of 10, 12 and 16-in. coated steel pipe for main water supply lines in connection with development of new source of supply at Twin Lakes. Entire project will cost $793,000. Financing has been arranged through Federal aid. Daniel J. McQuaid, 432 North Main Street, Sheridan, is consulting engineer.

Everett, Wash., plans about 21,000 ft. of 52-in. and 81,000 ft. of 48-in. steel pipe from municipal screening plant on Panther Creek to point on Snohomish River, for water supply for sulphite pulp mill of Soundview Pulp Co., which will expand plant at early date; also for about 27,750 ft. of heavy wood stave pipe. Entire water supply project will cost about $1,200,000. Financing will be arranged through Federal aid.

Galena Park, Tex., closes bids July 15 for 8 and 6-in. for water system, including 2-in. for lateral lines; also for 50,000-gal. steel ground reservoir, 100,000-gal. steel tank, pumping machinery and auxiliary equipment. Fund of $60,000 has been arranged through Federal aid. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Pleasanton, Tex., plans about five miles for water system; also elevated steel tank and tower and pumping station. Cost about $45,000. Financing is being arranged through Federal aid. A. A. Ririe, 655 East Woodlawn Avenue, San Antonio, Tex., is consulting engineer.

Lexington, Ky., plans about five miles of 24-in. for main water line from proposed new purification plant to city limits, and two 20-in. pipe lines for connection with distributing system. Project will include impounding 3,000,000,000-gal. reservoir, purification 20,000,000-gal. works, pumping plant and other waterworks structures. Cost $3,400,000. Financing is being arranged through Federal aid. J. S. Watkins, Citizens' Bank Building, Lexington, is consulting engineer.

Aexander Water Co., Alexander, Va., plans about seven miles of 8 to 16-in., for water supply for fire protection system. Contract is being arranged with city for installation. Cost about $145,000.

Mount Pleasant, N. C., closes bids July 16 for about 3½ miles of 2 to 8-in. for water system; also for 100,000-gal. elevated steel tank and tower, deep well pumping machinery and accessories. Gilbert C. White Co., Durham, N. C., is consulting engineer.

Garner, N. C., plans pipe lines for water system; also other waterworks installation. Cost about $58,000. Financing will be arranged through Federal aid.

Ohio Water Service Co., Massillon, Ohio, plans about 5000 ft. for extensions in local water system. Contract has been made with municipality for installation.

Ashley, Ind., closes bids July 13 for pipe for water system; also for 60,000-gal. elevated steel tank and tower and pumping plant. Lennox & Matthews, Architects' & Builders' Building, Indianapolis, are consulting engineers.

Eau Claire, Wis., plans pipe line in Roosevelt Avenue for water system. Ordinance passed authorizing work. A. R. Garnock is city engineer.

Vermillion, Kan., plans pipe lines for water system; also other waterworks installation. Project has been approved by PWA and financing will be arranged through that source. Paulette & Wilson, National Reserve Building, Topeka, Kan., are consulting engineers.

East Bay Municipal Utility District at Oakland, Cal., has awarded 747 tons to United States Pipe & Foundry Co. and 383 tons to American Cast Iron Pipe Co.

Glendale, Cal., let 472 tons of 6, 8 and 12-in. to United States Pipe & Foundry Co.

Long Beach, Cal., has taken bids on 100 tons of 30-in.

Santa Monica, Cal., has opened bids on 119 tons of 4, 6 and 20-in.

Inglewood, Cal., has taken bids on 110 tons of 4 and 6-in.

. . . NON-FERROUS . . .

. . . Zinc prices reduced $2 a ton due to import threat.

o o o

. . . Tin market more buoyant as Bolivia relinquishes large quota deficiency.

o o o

. . . Copper quiet, but lead is moderately active.

NEW YORK, July 7.—Business in domestic copper maintains a quiet course. Week-end sales were 1029 tons, and served to bring the month's running total to 2752 tons. Aside from the fact that there has been some recent buying, though in small quantity, by independents, the domestic aspect has changed very little. The price continues firm and unchanged at 9.50c. a lb. A fair volume of demand from export sources, however, has raised export quotations to about 9.25c. a lb., usual Continental base ports.

The Week's Prices. Cents Per Pound for Early Delivery

	July 1	July 2	July 3	July 4	July 6	July 7
Electrolytic copper, Conn.*	9.50	9.50	9.50	9.50	9.50	9.50
Lake copper, N. Y.	9.62½	9.62½	9.62½	9.62½	9.62½	9.62½
Straits tin, Spot, New York	40.75	40.50	40.75	....	41.75	42.37½
Zinc, East St. Louis	4.85	4.85	4.85	4.85	4.85	4.75
Zinc, New York†	5.22½	5.22½	5.22½	5.22½	5.22½	5.12½
Lead, St. Louis	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York	4.60	4.60	4.60	4.60	4.60	4.60

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb., delivered.
Aluminum, No. 12 remelt No. 2 standard, in carloads, 17.00c. lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 13.00c. a lb., New York.
Quicksilver, $74.00 to $75.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	43.00c. to 44.00c.
Tin, bar	45.00c. to 46.00c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	17.00c.
*High brass sheets	15.12½c.
*Seamless brass tubes	17.37½c.
*Seamless copper tubes	17.50c.
*Brass rods	13.12½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.10c. to 6.10c.
Lead, bar	6.10c. to 7.10c.
Lead, Sheets, cut	8.25c.
Antimony, Asiatic	14.00c. to 15.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	28.50c. to 29.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	45.75c.
Tin, bar	47.75c.
Copper, Lake	10.25c. to 10.50c.
Copper, electrolytic	10.25c. to 10.50c.
Copper, castings	10.00c. to 10.25c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	15.00c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	49.75c.
Solder, ½ and ½	26.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.37½c.	8.12½c.
Copper, hvy. and wire	7.25	7.75c.
Copper, light and bottoms	6.25c.	6.75c.
Brass, heavy	4.12½c.	4.75c.
Brass, light	3.37½c.	4.12½c.
Hvy. machine composition	6.12½c.	6.62½c.
No. 1 yel. brass turnings	5.12½c.	5.62½c.
No. 1 red brass or compos. turnings	5.75c.	6.25c.
Lead, heavy	3.62½c.	4.00c.
Sheet aluminum	12.75c.	14.25c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.

Tin

Although at the moment the tin market is inactive from a seller's standpoint, prices are noticeably higher than they were a few days ago. The trend was irregularly downward last week, and conditions were dull generally until Friday. At that time, some good trading in shorts by professionals developed, while consumers began buying spot quantities in fair volume. The going price was about 40.75c. a lb. Higher prices this week are due to bullish news surrounding outcome of the International Committee meeting yesterday in London. Bolivia finally renounced her large tonnage deficiency in favor of other signatory countries. After proration, this amounts to quotas being established at 90 per cent. Tin interests, however, placed a bullish interpretation upon the arrangement, as it definitely removes the Bolivian backlog from future consideration. Today's official price in London was £182 10s. cash and £179 three months. The Eastern price was £178. The New York quotation on spot Straits metal today is 42.37½c.

Lead

Buying of pig lead was possibly a bit more quiet last week than in the preceding period, but the current week has opened favorably, and some sellers, at least, are disposing of their daily intake without difficulty. Demand is diversified, and cable makers are showing a bit more interest than heretofore. July requirements are estimated to be 30 per cent covered. Some metal is being sold for August delivery. The price is steady at 4.45c. a lb., St. Louis, and 4.60c., New York.

Zinc

Effective today, zinc prices have been lowered $2 a ton to the basis of 4.75c. a lb., East St. Louis. Previously a slighter reduction of $1 to 4.85c. occurred, but danger of imports on account of very low foreign quotations has prompted domestic sellers to make a further reduction. It is hoped the added sacrifice in prices here will be sufficient to dispel all threats of the metal being imported. June statistics revealed a rise in total stocks of roughly 3000 tons to 85,003 tons at the period's close. The increase was entirely in high grade, however, as Prime Western stocks declined by about 1500 tons to 59,929 tons. Total shipments decreased 2300 tons to 41,654 tons, while production held approximately unchanged at 44,947 tons.

FABRICATED STEEL

. . . Awards of 44,650 tons are the highest since March, 1935, and compare with 36,815 last week. New projects call for 19,220 tons as against 38,700 tons a week ago.

NORTH ATLANTIC STATES

White River Junction, Vt., 600 tons, bridge for Boston & Maine Railroad, to Phoenix Bridge Co.

Ansonia, Conn., 350 tons, building for American Brass Co., to American Bridge Co.

Turners Falls, Mass., 640 tons, bridge for New York, New Haven & Hartford Railroad, to Phoenix Bridge Co., Phoenixville, Pa.

New York, 140 tons, garage extension, to American Bridge Co.

New York, 120 tons, boiler supports, Combustion Engineering Co., to American Bridge Co.

Brooklyn, 12,100 tons, Maine Parkway bridge, to American Bridge Co.

Newburgh, N. Y., 195 tons, North End junior high school, to Belmont Iron Works, Philadelphia.

Canandaigua, N. Y., 125 tons, veterans' administration building, to Bethlehem Contracting Co., Bethlehem, Pa.

Massena, N. Y., 445 tons, Aluminum Co. of America building, to Lackawanna Steel Construction Corp., Buffalo.

Niagara Falls, N. Y., 200 tons, addition for Carborundum Co., to Bethlehem Steel Co.

Syracuse, N. Y., 530 tons, medical building for Syracuse University, to Bethlehem Steel Co.

Sayreville, N. J., 245 tons, three buildings for Titanium Pigment Co., to Savary & Glaeser.

Union County, N. J., 225 tons, grade crossing elimination, to American Bridge Co.

York, Pa., 185 tons, building, Schmidt & Ault Paper Co., to William Christenson & Co.

Annville, Pa., 115 tons, Lebanon County bridge, to Reading Steel Products Co.

Erie County, Pa., 105 tons, State highway bridge, to Erie Concrete & Steel Supply Co., Erie, Pa.

Homewood, Pa., 275 tons, Westinghouse factory building, to American Bridge Co.

Springdale, Pa., 215 tons, West Penn Power Co. offices and stores, to Fort Pitt Bridge Works Co., Pittsburgh.

Philadelphia, 1800 tons, Keebler-Weyl building, to Bethlehem Steel Co.

Philadelphia, 700 tons, addition to duPont paint plant, to Bethlehem Steel Co.

Sharon, Pa., 240 tons, building for Protective Home Circle, to Fort Pitt Bridge Works Co.

Pittsburgh, 270 tons, factory for the Mine Safety Appliance Co., to American Bridge Co.

Winaus, Md., 1000 tons, highway bridge over Pennsylvania Railroad, to Bethlehem Steel Co.

Washington, 195 tons, 18 lookout towers, Department of Agriculture, to International Derrick & Equipment Co., Columbus, Ohio.

SOUTH AND SOUTHWEST

Grundy, Va., 190 tons, railroad bridge over Dismal Creek, to Virginia Bridge Co., Roanoke, Va.

Calhoun, Tenn., 1300 tons, transmission towers for TVA, to American Bridge Co.

Guntersville, Ala., 310 tons, wall armor for TVA, to American Bridge Co.

Orange, Tex., 195 tons, court house, to Orange Car & Steel Co.

Vernon and Newton Counties, Tex., 435 tons, bridge, to Virginia Bridge Co.

Caddo Parish, La., 170 tons, overpass, to Mosher Steel Co., Dallas.

Woods County, Okla., 725 tons, bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.

Lauderdale, Miss., 265 tons, bridge, to Vincennes Bridge Co., Vincennes, Ind.

Crawford County, Ark., 350 tons, overpass, to Arkansas Foundry Co., Little Rock.

Baxter County, Ark., 325 tons, bridge, to Vincennes Steel Co.

State of New Mexico, 150 tons, four bridges, to Midwest Steel & Iron Works Co., Denver.

State of New Mexico, 715 tons, highway work, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

CENTRAL STATES

State of Indiana, 250 tons, bridge, to American Bridge Co.

Portage County, Ohio, 250 tons, Baltimore & Ohio grade crossing elimination, to Bethlehem Steel Co.

Detroit, 620 tons, bridge, to R. C. Mahon Co., Detroit.

Pontiac, Mich., 215 tons, American Forging & Socket Co. addition, to Taylor & Gaskin.

Pontiac, 270 tons, plant extension, Fisher Body Corp., to Jones & Laughlin Steel Corp.

Pontiac, 750 tons, General Motors Truck Corp. addition, to Jones & Laughlin Steel Corp.

Stark County, Ohio, 200 tons, highway bridge, to Burger Iron Co., Akron, Ohio.

Gary, Ind., 140 tons, bridge, to Duffin Iron Co., Chicago.

Knox County, Neb., 125 tons, bridge, to Paxton & Vierling Iron Works, Omaha.

Joliet, Ill., 120 tons, warehouse, to Mississippi Valley Structural Steel Co.

Moravia, Iowa, 465 tons, railroad viaduct, to American Bridge Co.

St. Louis, 570 tons, bridge, to Mississippi Valley Structural Steel Co., St. Louis.

Platte County, Mo., 145 tons, bridge, to St. Joseph Structural Steel Co., St. Joseph, Mo.

Clay County, Mo., 160 tons, bridge, to Missouri Valley Bridge & Iron Co.

Clay County, Mo., 165 tons, bridge, to Builders Structural Steel Co., Cleveland.

Republic County, Kan., 675 tons, bridge, to St. Joseph Structural Steel Co.

Ottumwa, Iowa, 265 tons, bridge for Burlington railroad, to American Bridge Co.

Milwaukee Road, 1450 tons, bridges, 500 tons to American Bridge Co., 950 tons to Bethlehem Steel Co.

WESTERN STATES

State of Colorado, 270 tons, bridge for the Santa Fe railroad, to American Bridge Co.

Denver, 600 tons, railroad bridge and highway bridge on All-American Canal project, to an unnamed bidder.

Yellowstone National Park, Wyo., 458 tons, bridge for Bureau of Public Roads, to an unnamed bidder.

State of Wyoming, 177 tons, bridges in two counties, to unnamed bidders.

San Francisco, 1500 tons, two hangar buildings on Yerba Buena Shoals, to Judson-Pacific Co., San Francisco.

Centerville, Cal., 190 tons, County bridge, to Bethlehem Steel Co.

Seattle, 100 tons, barge for Inland Navigation Co., to Barde Steel Co.

Niles, Cal., 707 tons, six State undercrossings and one bridge, to Ingalls Iron Works Co., Birmingham.

Los Angeles, 160 tons, shop building at Polytechnic high school, to Bethlehem Steel Co.

Oakland, Cal., 3500 tons, Illinois-Pacific Glass Co. plant, to Moore Dry Dock Co., Oakland.

San Bernardino, Cal., 200 tons, auditorium at Union high school, to Western Iron & Metal Co.

State of California, 120 tons, digging ladder for dredge, to Moore Dry Dock Co.

Portland, Ore., 165 tons, Milwaukee Avenue underpass, to Northwestern Equipment Co.

Hickam Field, T. H., 3500 tons, four double hangars at Army air field, to Bethlehem Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Lynnfield, Mass., 140 tons, State bridge.

Peabody, Mass., 108 tons, State bridge.

New York, 1060 tons, track alterations on Queensboro bridge.

Orleans County, N. Y., 450 tons, highway bridge; bids July 14.

Erie County, Pa., 170 tons, bridge; Baldwin Brothers, Cleveland, contractor.

Latrobe, Pa., 300 tons, stadium, St. Vincent's College.

Baltimore, 300 tons, warehouse on pier 7 for Canton Co.

Washington, 160 tons, store for Lerner Stores Corp.

SOUTH AND SOUTHWEST

Louisville, Ky., 2000 tons, for Petroleum Chemical Co.

Winfield, W. Va., 200 tons, hydro-electric plant for Kanawaha Valley Power Co.

Logan, W. Va., 850 tons, alteration and additions for Appalachian Power Co.

Clifton Forge, Va., 600 tons, State highway bridge.

State of Arkansas, 600 tons, highway projects.

CENTRAL STATES

Jackson, Mich., 525 tons, building.

Ironton, Ohio, 550 tons, highway bridge.

Pekin, Ill., 2000 tons, racks for American Distilling Co.

Wiscona, Wis., 620 tons, two bridges for Chicago & North Western Railroad.

Milwaukee, 1325 tons, grade separations for Milwaukee Road and Chicago & North Western.

State of Iowa, 2200 tons, bridges.

State of Illinois, 1050 tons, bridges.

State of North Dakota, 725 tons, bridges.

Jefferson City, Mo., 900 tons, penitentiary units; Boyle-Pryor Construction Co., Kansas City, low bidder on all projects, and Kellerman Contracting Co., St. Louis, and S. Patti Construction Co., Kansas City, low bidders by combining bids.

St. Louis, 135 tons, reconstruction of Kingshighway bridge over Wabash railway; bids July 24.

WESTERN STATES

Converse County, Wyo., 116 tons, State overhead crossing; bids July 9.

Los Angeles, 625 tons, three bridges for United States Engineers; Bethlehem Steel Co., low bidder.

Los Angeles, 159 tons, Kenilworth Avenue bridge for United States Engineers; Consolidated Steel Corp., low bidder.

Everett, Wash., 600 tons, addition to Soundview Pulp Co. plant; bids soon.

Tacoma, Wash., 400 tons, addition to St. Regis Pulp Co. plant; general contract awarded.

Glendale, Cal., 625 tons, bridge.

Culver City, Cal., 625 tons, bridge.

FABRICATED PLATES

AWARDS

Burlington, Vt., 420 tons, Tide Water Oil Co., three tanks, to Bethlehem Steel Co.

Hartford, Conn., 300 tons, tank, to Chicago Bridge & Iron Works.

Long Island City, N. Y., 670 tons, three molasses tanks, to Graver Tank & Mfg. Co.

Sayreville, N. J., 120 tons, steel bins and tanks, to M. H. Treadwell Co., Chicago.

Denver, 125 tons, five radial gates on Yakima project, to Valley Iron Works, San Juan, Tex.

Denver, 442 tons, siphons on city water system, to Thompson Mfg. Co. previously reported as structural steel.

Denver, 100 tons, gates and intake pipe at Moon Lake dam, to Lakeside Bridge & Steel Co., Milwaukee.

Seattle, 200 tons, barge for Inland Navigation Co., to Barde Steel Co.

The Dalles, Ore., 150 tons, oil tanks, to Barde Steel Co.

NEW PROJECTS

Los Angeles, 100 tons, 30-in. pipe for Metropolitan Water District, No. 62,666; bids opened.

June Pig Iron Output Up Slightly—First Half Rises 37.3 Per Cent

PRODUCTION of coke pig iron in June, at 2,586,240 tons, compares with 2,648,401 tons in May. The daily rate last month showed a rise of only 0.9 per cent over that of April, or from 85,432 to 86,208 tons.

Output for the first half of this year rose to 13,528,226 tons from 9,799,000 tons in the corresponding period last year, or a gain of 37.3 per cent in the daily rate during that period.

There was a loss of one furnace making iron on July 1, 145 furnaces operating at a rate of 85,405 tons daily, against 146 furnaces one month before which were producing iron at a rate of 86,030 tons daily. The steel corporation took three furnaces off blast, independent steel companies put one in operation, and merchant producers put three in and blew out or banked two furnaces.

Among the furnaces blown in are the following: Norton furnace of the American Rolling Mill Co.; Federal, of the By-Products Coke Co.; the Mystic Iron Works furnace, and the Rockdale furnace of the Tennessee Products Corp.

Furnaces blown out or banked include: One Donora. American Steel & Wire Co.; two Ensley furnaces of the Tennessee Coal, Iron & Railroad Co.; Perry furnace, Pickands, Mather & Co., and the Hamilton furnace of the Hamilton Coke & Iron Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	.....	49,041	39,510	57,821	18,461
August	.....	56,816	34,012	59,142	17,115
September	.....	59,216	29,935	50,742	19,753
October	.....	63,820	30,679	43,754	20,800
November	.....	68,864	31,898	36,174	21,042
December	.....	67,950	33,149	38,131	17,615
Year	.....	67,556	43,592	26,199	23,733

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1936	1935	1936	1935
January	2,025,885	1,477,336	24,766	10,048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	.....	1,520,263	.....	13,175
August	.....	1,761,286	.....	12,735
September	.....	1,776,476	.....	15,983
October	.....	1,978,411	.....	19,007
November	.....	2,065,913	.....	18,245
December	.....	2,106,453	.....	17,126
Year	.....	21,007,802	.....	185,173

*These totals do not include charcoal pig iron. The 1934 production of this iron was 25,834 gross tons.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256
February	11,296	6,288	7,071	2,863	7,251
March	10,831	7,089	7,197	2,412	1,157
April	13,897	8,799	8,838	1,908	5,287
May	12,814	8,441	9,099	3,129	4,658
June	14,209	7,874	9,499	4,088	6,090
July	.....	8,644	7,880	6,783	3,329
August	.....	8,194	6,043	7,756	3,070
September	.....	10,090	4,986	10,034	3,213
October	.....	11,199	5,765	8,634	4,286
November	.....	12,503	6,610	7,639	4,435
December	.....	13,312	4,399	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) June (30 Days)	Production (Gross Tons) May (31 Days)	July 1 Number in Blast	July 1 Operating Rate, Tons a Day	June 1 Number in Blast	June 1 Operating Rate, Tons a Day
New York:						
Buffalo	180,007	177,576	10	6,000	10	5,730
Other New York and Mass.	30,078	21,091	3	1,055	2	680
Pennsylvania:						
Lehigh Valley	46,318	43,338	4	1,545	4	1,400
Schuylkill Valley	23,556	24,799	2	785	2	800
Susquehanna and Lebanon Valleys	12,283	14,080	1	410	1	455
Ferromanganese	.....	.....	0	....	0	....
Pittsburgh District	592,435	578,690	29	19,275	29	19,065
Ferro. and Spiegel	9,058	17,377	2	300	3	560
Shenango Valley	53,785	36,438	3	1,795	3	1,670
Western Pennsylvania	81,100	79,188	4	2,610	5	2,555
Ferro. and Spiegel	5,872	6,067	1	195	1	195
Maryland	92,648	102,847	4	3,090	4	3,485
Wheeling District	137,704	146,504	7	4,590	7	4,725
Ohio:						
Mahoning Valley	266,412	271,079	13	8,880	13	8,970
Central and Northern	239,246	243,123	13	7,975	13	7,670
Southern	10,694	40,146	2	320	3	940
Illinois and Indiana	523,036	537,668	25	17,575	24	17,345
Michigan and Minnesota	76,750	80,832	5	2,560	5	2,605
Colorado, Missouri and Utah	40,006	40,276	3	1,335	3	1,140
The South:						
Virginia	.....	.....	0	....	0	....
Ferro. and Spiegel	2,619	2,767	1	90	1	90
Kentucky	13,395	14,012	2	780	1	450
Alabama	147,741	170,503	10	4,240	12	5,500
Ferromanganese	.....	.....	0	....	0	....
Tennessee	1,497	.....	1	50	0	....
Total	2,586,240	2,648,401	145	85,405	146	86,030

*Revised, Portsmouth furnace of Wheeling Steel Corp. was banked in May.

Wheeling Strike at Portsmouth Settled

PORTSMOUTH, Ohio, July 7.—A tentative agreement ending the six-weeks' strike at the plant of the Wheeling Steel Corp. here has been reached between representatives of the Amalgamated Association of Iron, Steel and Tin Workers and Parker Wilson, assistant to the president of the Wheeling company. While the agreement is to be ratified by the employees, the union committee acting on their behalf has strongly urged its acceptance.

All of the 5500 employees will return to work, probably late this week, at the same wage schedule in effect at the time the strike began, according to reports. It is also understood that the five union leaders accused of leading a riot in which one man was killed, will not be reemployed. A further company victory was reported in an agreement that the company may continue dealing with the seventeen departmental workers' councils instead of recognizing the Amalgamated as a bargaining agency.

IRON AND STEEL SCRAP

. . . Higher quotations at Pittsburgh and Philadelphia raise composite price to $13.08 a ton.

o o o

. . . Railroad material coming out freely at Chicago.

o o o

. . . Foundry grades are generally strong.

JULY 7.—Continued high open-hearth operations have given the scrap market a stronger tone, and THE IRON AGE composite price has been advanced 12c. a gross ton to $13.08. Higher levels are reported from both Pittsburgh and Philadelphia, while the quotation at Chicago is unchanged. However, the appearance of heavy railroad tonnages in the latter district is proving somewhat embarrassing to dealers.

The threat of labor trouble in the steel industry is being watched carefully by both buyers and sellers of scrap, and the only immediate market effect has been a tendency on the part of mills to boost shipping schedules. Brokers are somewhat nervous over the outlook, as they would naturally suffer severely in case of strikes at important consuming points.

Pittsburgh

Although no new purchases have been made during the past week the market continues firm. Scrap is still tight and dealers with $13.50 orders are paying as high as $14 to cover. While it was possible a week ago for some brokers to pick up steel at $13.50, such sources have now practically dried up. A small sale of No. 1 heavy melting at $14 was made at the same time that $13.75 purchases were consummated. This factor, combined with the difficulty on the part of dealers to cover their orders makes the market quotable at $13.50 to $14 for No. 1 heavy melting. Some brokers are still uninterested in $14 sales since they feel that the trend in scrap prices is upward.

Chicago

Some of the railroad material purchased at high levels has started to come on track, and brokers, having completed most of their high priced orders, find themselves in an uncomfortable position. Mills have paid as high as $13.50, and while the price is rather firm at this figure there seems little opportunity at this time to drive the consumers' price higher and thereby absorb losses that are beginning to occur. Some consumers have indicated that they will be out of the market for a month, though this may be only their way of warding off sales efforts for the time being.

St. Louis

Sales of approximately 5000 tons of No. 2 heavy melting steel at current levels to an East Side melter was reported last week. The market is firmer, with offerings light. No. 1 locomotive tires and steel car axles have advanced $1 a ton, and railroad springs and cast iron car wheels, 50c.

Cincinnati

The market continues inactive. Sales of small urgencies constitute the bulk of current business. Dealers are covering for contracts, but speculation is absent. Interest centers in the Louisville & Nashville Railroad list of 15,000 tons on which a right to withdraw 5000 tons of usable material is reserved.

Detroit

This market continues bullish and largely speculative, since there has been little taking at the present prices. An advance of 25c. a ton on most items has followed a much sharper upswing of the previous week. The present market rise is considered premature as mills face declining melting rates in midsummer with labor difficulties in the offing.

Buffalo

The threat of possible labor trouble has had the effect of lifting suspensions on scrap shipments and all the dealers who have had recent orders are shipping. No new sales of consequence were made during the week. Bethlehem continues to offer $12 for No. 1 heavy melting steel, but none of the larger dealers will sell at this price and the receipts are small.

Boston

Buying for export continues active. Prices did not change last week, but exporters indicate that they may lift bids for sizable desirable tonnages. A boat is still loading No. 2 steel here for Japan, and three charters have been made for July sailings from here and one from Providence. Last week 3800 tons of relaying rails was shipped to the Savannah & Atlanta Railroad. Scrap tin exports to Japan will be resumed this week. Sentimentally, the market for No. 1 heavy melting steel, Pittsburgh district delivery, is firmer, but still quiet.

New York

The metropolitan scrap market is sentimentally stronger this week, although it has been generally quiet. Shipments to Eastern Pennsylvania are light, and practically all of the export loading is being done on old orders. A stronger tone to the market in the face of possible labor troubles and a curtailment in operations is hard to explain, but it seems to be based on the expectation that mills will be forced to renew their supplies shortly in order to maintain operations throughout this month. The increases in New York prices for No. 1 and No. 2 steel in the July 2 issue were in error and were intended for export prices. The prices should have read $8.75 to $9.25 and $7.50 to $8.00 respectively, while export prices at New York for No. 1 and No. 2 steel should have read $10 and $9 respectively.

Cleveland

Strength in the adjoining districts is reflected in the local market, which is firm in spite of lack of severity. Machine shop turnings and short shoveling turnings have advanced 25c. a ton, these being the only price changes. The only consumer purchase reported is a small tonnage of No. 1 heavy melting steel by the Lorain steel plant. Brokers are still making some purchases to fill outstanding orders. The supply of No. 1 heavy melting steel in local yards is quite low. Dealers are paying $13.50 to $13.75 for this grade for Youngstown district delivery. Automobile scrap lists for July brought higher prices than they did for June. Couplers and knuckles offered by the New York Central Railroad last week are reported to have brought $16.75.

Philadelphia

Responding to the rising tone of the steel market, the scrap market has advanced. Increases of 50c. a ton have been made, based on sales, in No. 1 steel, heavy breakable cast and No. 1 cast. The market for bundled sheets, however, has sagged and is down 50c., based on present quotations.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.50 to	$14.00
No. 2 hvy. mltng. steel.	12.50 to	13.00
No. 2 RR. wrought	13.50 to	14.00
Scrap rails	13.50 to	14.00
Rails, 3 ft. and under..	16.00 to	16.50
Comp. sheet steel	13.50 to	14.00
Hand bundled sheets..	12.50 to	13.00
Hvy. steel axle turn...	12.00 to	12.50
Machine shop turn....	9.00 to	9.50
Short shov. turn.....	9.25 to	9.75
Mixed bor. & turn. ...	7.50 to	8.00
Cast iron borings.....	10.00 to	10.50
Cast iron carwheels...	13.50 to	14.00
Hvy. breakable cast..	12.50 to	13.00
No. 1 cast	14.50 to	15.00
R.R. knuckles & cplrs..	16.50 to	17.00
Rail. coil & leaf springs	16.50 to	17.00
Rolled steel wheels....	16.50 to	17.00
Low phos. billet crops.	17.50 to	18.00
Low phos. sh. bar.....	17.00 to	17.50
Low phos. punchings.	16.25 to	16.75
Low phos. plate scrap.	16.00 to	16.50
Steel car axles	15.50 to	16.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.75 to	$13.25
No. 2 hvy. mltng. steel.	11.75 to	12.25
Comp. sheet steel	11.75 to	12.25
Light bund. stampings	8.50 to	9.00
Drop forge flashings...	11.50 to	12.00
Machine shop turn.....	8.00 to	8.50
Short shov. turn.....	8.50 to	9.00
No. 1 busheling	8.25 to	8.75
Steel axle turnings....	8.50 to	9.00
Low phos. billet crops	17.00 to	17.50
Cast iron borings	8.50 to	8.75
Mixed bor. & turn....	8.50 to	8.75
No. 2 busheling	8.50 to	8.75
No. 1 cast	14.50 to	15.00
Railroad grate bars...	8.00 to	8.50
Stove plate	9.00 to	9.50
Rails under 3 ft.	16.00 to	16.50
Rails for rolling	16.50 to	17.00
Railroad malleable ...	17.00 to	17.50
Cast iron carwheels...	....	15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.00 to	$12.50
No. 2 hvy. mltng. steel.	$11.00 to	11.50
Hydraulic bund., new.	12.00 to	12.50
Hydraulic bund., old..	9.00 to	9.50
Steel rails for rolling..	15.00 to	15.50
Cast iron carwheels...	13.50 to	14.00
Hvy. breakable cast...	13.00 to	13.50
No. 1 cast	14.00 to	14.50
Stove plate (steel wks.)	10.00 to	10.50
Railroad malleable ...	....	16.50
Machine shop turn....	8.00 to	8.50
No. 1 blast furnace....	....	6.25
Cast borings	....	6.25
Heavy axle turnings..	11.00 to	11.50
No. 1 low phos. hvy....	16.00 to	16.50
Couplers & knuckles..	16.00 to	16.50
Rolled steel wheels....	16.00 to	16.50
Steel axles	16.00 to	16.50
Shafting	18.50 to	19.00
No. 1 RR. wrought....	14.50 to	15.00
Spec. iron & steel pipe	12.00 to	12.50
Bundled sheets	11.50 to	12.00
No. 1 forge fire	12.00 to	12.50
Cast borings (chem.)..	10.50 to	13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$13.00 to	$13.50
Auto. hvy. mltng. steel	11.00 to	11.50
Shoveling steel	13.00 to	13.50
Hydraul. comp. sheets.	12.00 to	12.50
Drop forge flashings..	11.50 to	12.00
No. 1 busheling.....	11.50 to	12.00
Rolled carwheels	15.00 to	15.50
Railroad tires cut	14.50 to	15.00
Railroad leaf springs..	14.50 to	15.00
Axle turnings	12.00 to	12.50
Steel coup. & knuckles	14.50 to	15.00
Coil springs	16.00 to	16.50
Axle turn. (elec.).....	12.75 to	13.25
Low phos. punchings..	15.50 to	16.00
Low phos. plates, 12 in. and under	15.50 to	16.00
Cast iron borings	6.00 to	6.50
Short shov. turnings..	6.25 to	6.75
Machine shop turn....	5.50 to	6.00
Rerolling rails	14.00 to	14.50
Steel rails under 3 ft...	15.25 to	15.75
Steel rails under 2 ft...	15.75 to	16.25
Angle bars, steel	14.50 to	15.00
Cast iron carwheels ..	13.50 to	14.00
Railroad malleable ...	15.50 to	16.00
Agric. malleable	13.50 to	14.00
	Per Net Ton	
Iron car axles	$17.50 to	$18.00
Steel car axles	14.75 to	15.25
No. 1 RR. wrought....	11.50 to	12.00
No. 2 RR .wrought....	11.50 to	12.00
No. 2 busheling, old...	$6.00 to	$6.50
Locomotive tires	12.00 to	12.50
Pipes and flues	8.00 to	8.50
No. 1 machinery cast..	12.00 to	12.50
Clean auto. cast	11.00 to	11.50
No. 1 railroad cast....	11.00 to	11.50
No. 1 agric. cast.....	10.00 to	10.50
Stove plate	7.00 to	7.50
Grate bars	8.50 to	9.00
Brake shoes	8.50 to	9.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$12.00 to	$12.50
No. 2 hvy. mltng. steel.	11.25 to	11.75
Scrap rails	12.00 to	12.50
New hy. b'ndled sheets	11.25 to	11.75
Old hydraul. bundles..	10.25 to	10.75
Drop forge flashings..	11.25 to	11.75
No. 1 busheling	11.25 to	11.75
Hvy. axle turnings...	10.50 to	11.00
Machine shop turn....	6.00 to	6.50
Knuckles & couplers..	15.00 to	15.50
Coil & leaf springs....	15.00 to	15.50
Rolled steel wheels....	15.00 to	15.50
Low phos. billet crops.	15.50 to	16.00
Short shov. turnings..	9.00 to	9.50
Mixed bor. & turn....	8.00 to	8.50
Cast iron borings.....	8.00 to	8.50
No. 2 bushelings	....	6.50
Steel car axles	13.50 to	14.00
Iron axles	12.00 to	12.50
No. 1 machinery cast..	13.00 to	13.50
No. 1 cupola cast.....	12.00 to	12.50
Stove plate	10.50 to	11.00
Steel rails, under 3 ft.	15.75 to	16.25
Cast iron carwheels...	11.50 to	12.00
Railroad malleable	15.00 to	15.50
Chemical borings	9.00 to	9.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$11.00 to	$11.50
Scrap steel rails.....	11.50 to	12.00
Short shov. turnings..	....	7.00
Stove plates	....	8.00
Steel axles	12.00 to	12.50
Iron axles	12.00 to	12.50
No. 1 RR. wrought....	8.50 to	9.00
Rails for rolling	12.50 to	13.00
No. 1 cast	12.00 to	12.50
Tramcar wheels	11.00 to	12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. steel....	$12.50 to	$13.00
No. 1 hvy. melting....	12.25 to	12.75
No. 2 hvy. melting....	9.75 to	10.25
No. 1 locomotive tires.	12.00 to	12.50
Misc. stand-sec. rails..	13.00 to	13.50
Railroad springs	14.00 to	14.50
Bundled sheets	9.50 to	10.00
No. 2 RR. wrought....	12.00 to	12.50
No. 1 busheling	7.50 to	8.00
Cast bor. & turn.....	4.00 to	4.50
Rails for rolling	13.75 to	14.25
Machine shop turn....	4.00 to	4.50
Heavy turnings	9.25 to	9.75
Steel car axles	14.00 to	14.50
Iron car axles	15.00 to	16.00
No. 1 RR. wrought....	10.50 to	11.00
Steel rails under 3 ft...	14.25 to	14.75
Steel angle bars	14.00 to	14.50
Cast iron carwheels...	11.50 to	12.00
No. 1 machinery cast.	10.75 to	11.25
Railroad malleable ...	13.50 to	14.00
No. 1 railroad cast....	11.00 to	11.50
Stove plate	7.50 to	8.00
Agricul. malleable	12.50 to	13.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to	$10.00
No. 2 hvy. mltng. steel.	7.50 to	8.00
Scrap rails for mltng.	10.00 to	10.50
Loose sheet clippings.	5.25 to	5.75
Bundled sheets	7.25 to	7.75
Cast iron borings	4.50 to	5.00
Machine shop turn	5.25 to	5.75
No. 1 busheling	8.00 to	8.50
No. 2 busheling	3.75 to	4.25
Rails for rolling	10.50 to	11.00
No. 1 locomotive tires	9.00 to	9.50
Short rails	13.50 to	14.00
Cast iron carwheels ..	10.00 to	10.50
No. 1 machinery cast..	11.00 to	11.50
No. 1 railroad cast....	10.25 to	10.75
Burnt cast	7.25 to	7.75
Stove plates	7.25 to	7.75
Agricul. malleable	9.25 to	9.75
Railroad malleable	11.00 to	11.50

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.75 to	$10.25
No. 2 hvy. mltng. steel.	8.75 to	9.25
Boring and turnings..	6.50 to	7.00
Long turnings	6.25 to	6.75
Short shov. turnings..	7.00 to	7.50
No. 1 machinery cast..	14.50 to	15.00
Automotive cast	$13.25 to	$13.75
Hydraul. comp. sheets	10.50 to	11.00
Stove plate	8.00 to	8.50
New factory bushel...	9.50 to	10.00
Old No. 2 busheling...	5.50 to	6.00
Sheet clippings	7.00 to	7.50
Flashings	9.50 to	10.00
Low phos. plate scrap	10.75 to	11.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Hvy. melting steel.....	$7.50	$7.00
Rails, scrap	8.50	8.00
Machine shop turn.....	4.00	4.00
Boiler plate	7.00	6.00
Hvy. axle turnings.....	4.50	4.00
Cast borings	5.00	4.50
Steel borings	4.00	4.00
Wrought pipe	4.00	4.00
Steel axles	8.50	9.00
Axles, wrought iron....	9.00	9.50
No. 1 machinery cast..	11.50	11.00
Stove plate	7.50	7.00
Standard carwheels	11.00	10.50
Malleable	7.00	7.00
Shoveling steel	6.50	6.00
Bushelings	6.00	5.50
Compressed sheets	6.50	6.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to	$13.50
Hydraulic bundles	13.00 to	13.50
Machine shop turn....	9.50 to	10.00

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$8.75 to	$9.25
No. 2 hvy. mltng. steel	7.50 to	8.00
Hvy. breakable cast..	8.50 to	9.00
No. 1 machinery cast.	9.00 to	9.50
No. 2 cast	7.75 to	8.25
Stove plate	6.75 to	7.25
Steel car axles	13.00 to	13.50
Shafting	14.00 to	14.50
No. 1 RR. wrought....	9.00 to	9.50
No. 1 wrought long....	8.50 to	9.00
Spec. iron & steel pipe	8.50 to	9.00
Forge fire	7.50 to	8.00
Rails for rolling.....	10.50 to	11.00
Short shov. turnings..	3.50 to	3.75
Machine shop turn....	3.50 to	3.75
Cast borings	4.50 to	5.00
No. 1 blast furnace....	3.00 to	3.50
Cast borings (chem.)..	9.50 to	10.50
Unprepar. yard scrap.	5.00 to	5.50

Per gross ton, delivered local foundries:

No. 1 machin. cast....	....	$11.50
No. 1 hvy. cast cupola.	....	9.50
No. 2 cast	....	8.00

Add 50c. to 75c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$7.50 to	$7.90
Scrap rails	7.50 to	8.00
No. 2 steel	6.50 to	6.90
Breakable cast	7.50 to	7.79
Machine shop turn....	....	3.40
Bund. skeleton, long..	....	6.40
Shafting	13.25 to	13.50
Cast bor., chemical...	5.00 to	7.00

Per gross ton delivered consumers' yards:

Textile cast	$11.00 to	$11.50
No. 1 machin. cast....	11.00 to	11.50
Stove plate	....	9.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	....	$10.00
No. 2 hvy. mltng. steel.	....	9.00
No. 2 cast	$8.00 to	8.50
Stove plate	7.00 to	7.25
Rails (scrap)	10.50 to	11.00

Philadelphia, on cars at Port Richmond

No. 1 heavy melting steel.....	$11.00

Boston, on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	....	$10.50
No. 2 hvy. mltng. steel.	....	9.50
Rails (scrap)	....	10.50
Stove plate	....	7.50
Machine shop turn ...	$4.75 to	5.00

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$10.00 to	$10.50
No. 2 hvy. mltng. steel.	9.00 to	9.50

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to	$11.00
Compressed bundles ..	8.50 to	9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$30.00
Forging quality	37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$30.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c.

Wire Rods
(Nos. 4 and 5)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$38.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	1.95c.
F.o.b. Chicago or Gary	2.00c.
F.o.b. Duluth	2.10c.
Del'd Detroit	2.10c.
F.o.b. Cleveland	2.00c.
F.o.b. Buffalo	2.05c.
Del'd Philadelphia	2.26c.
Del'd New York	2.30c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.35c.
F.o.b. cars Pacific ports	2.50c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	1.80c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.10c.
Del'd Detroit	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Cleveland, Chicago and Gary	2.30c.
F.o.b. Buffalo	2.35c.
Del'd Detroit	2.45c.
Del'd eastern Michigan	2.50c.

*In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago or Gary	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Coatesville or Spar. Pt.	2.00c.
Del'd Philadelphia	2.09c.
Del'd New York	2.19c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.45c.
F.o.b. Chicago	3.50c.
F.o.b. Coatesville	3.55c.
F.o.b. cars dock Gulf ports	3.85c.
F.o.b. cars dock Pacific ports	4.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Buffalo or Bethlehem	2.00c.
Del'd Philadelphia	2.115c.
Del'd New York	2.1625c.
F.o.b. Birmingham (standard)	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Steel Sheet Piling

	Base per l b.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Buffalo	2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes	2.60
Tie plates, steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	3.60
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.95c.
No. 10, f.o.b. Gary	2.05c.
No. 10, de'd Detroit	2.15c.
No. 10, del'd Philadelphia	2.26c.
No. 10, f.o.b. Birmingham	2.10c.
No. 10, f.o.b. cars dock Pacific ports	2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.50c.
No. 24, f.o.b. Gary	2.60c.
No. 24, del'd Detroit	2.70c.
No. 24, del'd Philadelphia	2.81c.
No. 24, f.o.b. Birmingham	2.65c.
No. 24, f.o.b. cars dock Pacific ports	3.15c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.60c.
No. 10 gage, f.o.b. Gary	2.70c.
No. 10 gage, f.o.b. Detroit	2.80c.
No. 10 gage, del'd Philadelphia	2.91c.
No. 10 gage, f.o.b. Birmingham	2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.05c.
No. 20 gage, f.o.b. Gary	3.15c.
No. 20 gage, del'd Detroit	3.25c.
No. 20 gage, del'd Philadelphia	3.36c.
No. 20 gage, f.o.b. Birmingham	3.20c.
No. 20 f.o.b. cars dock Pacific ports	3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.20c.
No. 24, f.o.b. Gary	3.30c.
No. 24, del'd Philadelphia	3.51c.
No. 24, f.o.b. Birmingham	3.35c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.50c.
F.o.b. Gary	3.60c.
F.o.b. cars dock Pacific ports	4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.05c.
No. 20, f.o.b. Gary	3.15c.
No. 20, f.o.b. Birmingham	3.65c.
No. 20, f.o.b. cars dock Pacific ports	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific ports	3.35c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.95c.
All widths up to 24 in., Chicago	2.05c.
All widths up to 24 in., del'd Detroit	2.15c.
All widths up to 24 in., Birmingham	2.10c.
Cooperage stock, Pittsburgh	2.05c.
Cooperage stock, Chicago	2.15c.

Cold-Rolled Strips*

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

*Carbon 0.25 and less.

Cold-Rolled Spring Steel

	Pittsburgh and Cleveland	Worcester
Carbon 0.25-0.50%	2.60c.	2.80c.
Carbon .51- .75	3.45c.	3.65c.
Carbon .76-1.00	4.95c.	5.15c.
Carbon Over 1.00	6.50c.	6.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.40c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.10
Smooth coated nails	2.10

	Base per 100 Lb.
Annealed fence wire	$2.65
Galvanized fence wire	3.00
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Twisted barbless wire	2.60
Woven wire fence, base column	58
Single loop bale ties, base column	51

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	57	37	⅛	..+91½	+138
¼ to ⅜	.60	44½	¼ & ⅜	+1½	+21½
½	.....64½	55	½	.....31½	15
¾	.....67½	59	¾	.....36½	20½
1 to 3	...69½	61½	1 & 1¼	.39½	25½
			1½	.....43½	28
			2	.....41½	26

Lap Weld

2	62	53½	2	37	22½
2½ to 3.65		56½	2½ to 3½	38	25
3½ to 6.67		58½	4 to 8	...40	28½
7 & 8.66		56½	9 to 12	..38	24½
9 & 10.65		56			
11 & 12.64		55			

Butt Weld, extra strong, plain ends

⅛	.....55½	42½	⅛	...+13	+45½
¼ to ⅜	.57½	46½	¼ & ⅜	+2½	+34½
½	.....62½	54½	½	.....32½	17½
¾	.....66½	58½	¾	.....37½	22½
1 to 3	...68	61	1 to 2	..43½	29

Lap Weld, extra strong, plain ends

2	60	52½	2	40	26
2½ to 3.64		56½	2½ to 4	45½	33
3½ to 6.67½		60	4½ to 6	45	33½
7 & 8	..66½	57	7 & 8	.46	33
9 & 10	..65½	56	9 to 12.41	½	30
11 & 12	..64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2¼ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
4½ in o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½ %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$48.40
6-in. and larger, del'd New York	45.20
*6-in. and larger, Birmingham	40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
F.o.b. dock, Seattle	51.50

Class "A" and gas pipe, $3 extra.
4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39, Birmingham, and $47.40, delivered Chicago and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	70 and 10
Larger than ½ in.	70 and 5
Lag bolts	70 and 5
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 5
Hot-pressed nuts, blank or tapped, square	70 and 5
Hot-pressed nuts, blank or tapped, hexagon	70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 10
Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 5
Stove bolts in bulk	82½
Tire bolts	50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.05
F.o.b. Chicago or Birmingham	3.15

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Clevelahd	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.55c.
Delivered price at Detroit is	2.70c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	$0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. base per lb. Delivered Detroit, 3.20c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	57½c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15¾c.
Regular	12½c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports
Based on exchange rate as of July 6

Ferromanganese, export	$45.24
Billets, open-hearth	29.57 to $30.83
Tin plate, per base box	4.77 to 4.80
Steel bars, open-hearth	39.58
Beams, open-hearth	38.33
Channels, open-hearth	39.58
Angles, open-hearth	38.33
Black sheets, No. 24 gage	49.00
Galvanized sheets, No. 24 gage	59.05

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports
Based on Exchange rate of July 6

Billets, Thomas	$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, ¼ in. and up	35.42
Plate, 3/16 in. and 5 mm.	34.35
Sheets, ⅛ in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.05c.
Reinforcing steel bars	3.05c.
Cold-finished and screw stock:	
Rounds and hexagons	3.50c.
Squares and flats	3.50c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops and bands under ¼ in.	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.35c.
Galv. sheets (No 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.77
Spikes, large	3.10c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.65
Wire, black, soft ann'l'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg.	2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.10c.
Soft steel bars, squares and hexagons	3.25c.
Cold-fin. steel bars:	
Rounds and hexagons	3.65c.
Flats and squares	3.65c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	3.95c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.70c.
Track bolts (keg lots)	4.70c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.
	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	87½
Cut point set screws	75 and 10
Flat head bright wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.95
Com. wire nails, 50 kegs or more	2.40c.†
Cement c't'd nails, 50 kegs or more	2.40c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are fo.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.96c.
Flats and squares	3.96c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	Special
Long terne sheets (No. 24)	5.25c.
Standard tool steel	11.25c.
Wire, black annealed (No. 10)	3.50c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x ½ in. and larger	3.75c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	$3.21
	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10
Boiler tubes:	*Per 100 Ft.*
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.35c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.50c.
Cold-fin. rounds, shafting, screw stock	3.90c.
Hot-rolled annealed sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.20c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.00c.
Boiler rivets	4.10c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.15c.
‡Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.91c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.75c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.50c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.	$2.40
*No. 9 galv. wire, per 100 lb.	2.75
*Com. wire nails, base per keg	2.35

†Outside delivery 10c. less.

*For 5000 lb. or less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Bars, rounds, flats and angles	3.32c.
Other shapes	3.47c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.87c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more	4.62c.
Galv. sheets (No. 24) 500 lb. or less	4.47c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.38c.
Struc. shapes	3.25c.
Soft steel bars	3.05c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.55c.
Rounds and hex.	3.55c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.43c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg.	$3.10
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Beams, channels, angles, tees, zees	3.54c.
H beams and shapes	3.54c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.56c.
Floor plates, diamond pattern.	5.36c.
Bar and bar shapes (mild steel)	3.45c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.70c.
Tire steel	4.70c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.90c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.00c.
Lead coated sheets, No. 24 ga.	5.85c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.19c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.04c.
Hot-rolled sheets (No. 10)**	3.24c.
Galvanized sheets (No. 24)	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.79c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.21c.
Soft steel bars, squares and hexagons	3.36c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Galvanized sheets (No. 20)	4.76c.
Cold-finished steel bars	3.61c.
Cold-rolled strip	3.38c.
Structural rivets (keg lots)	3.91c.
Boiler rivets, cone head (keg lots)	4.01c.
Track spikes (keg lots)	3.81c.
Track bolts (keg lots)	4.81c.
Black annealed wire	4.06c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

	Per Cent Off List
Machine bolts, carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.35c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	3.90c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.20c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
*Mild steel bars	3.00c.
**Reinforcing bars	2.85c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10	3.10c.
‡Hot-rolled annealed sheets, No. 24	3.60c.
‡Galvanized sheets, No. 24	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
§Cold-rolled rounds	3.73c.
§Cold-rolled squares, hex. and flats	3.73c.
Rivets	4.40c.
Bolts and nuts, per cent off list	60 and 10

*Quantity extras per size apply.

†Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over, base; 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb. add 30c.; 0 to 999 lb., add 50c.

‡25 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 24 bundles add 25c.

§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add $1.00; for 0 to 299 lb. add $1.75; for combined order under 100 lb. add $3.00.

**For orders 4000 lb. to 9999 lb. Add 15c. per 100 lb. for orders 2000 to 3999 lb.; add 65c. for orders less than 2000 lb.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.36c.
Iron bars	3.36c.
Reinforcing bars	3.36c.
Structural shapes	3.56c.
Plates	3.56c.
Hot-rolled sheets, No. 10	3.36c.
Hot-rolled annealed sheets No. 24	4.16c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.61c.
Cold-finished bars	4.13c.

MEMPHIS

	Base per Lb.
Mild steel bars	3.47c.
Shapes, bar size	3.47c.
Iron bars	3.47c.
Structural shapes	3.67c.
Plates	3.67c.
Hot-rolled sheets, No. 10	3.47c.
Hot-rolled annealed sheets, No. 24	4.27c.
Galvanized sheets, No. 24	4.80c.
Steel bands	3.72c.
Cold-drawn rounds	3.89c.
Cold-drawn flats, squares, hexagons	5.89c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	70
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.35c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c.
Cold-finished steel bars	4.30c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.65
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.25c.	3.60c.	3.80c.
Shapes, standard	3.25c.	3.60c.	3.80c.
Soft steel bars	3.25c.	3.60c.	3.95c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.10c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.35c.	3.70c.	3.75c.
Galv. sheets (No. 24 and lighter)	4.50c.	4.40c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.60c.	5.00c.
Cold finished steel			
Rounds	5.80c.	5.85c.	6.00c.
Squares and hexagons	7.05c.	7.10c.	7.25c.
Flats	7.55c.	7.60c.	8.25c.
Common wire nails—base per keg less carload	$2.90	$2.90	$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$45.00
High-heat duty, New Jersey	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	40.00
Intermediate, New Jersey	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	$48.00 to 50.00
Silica cement per net ton	8.00

Chrome Brick

	Per Net Ton
Standard f.o.b Baltimore, Plymouth Meeting and Chester	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.c b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	$20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	20.5807
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.50

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia	20.8132
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	20.0807
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.	$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham	20.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$24.00

Gray Forge

Valley or Pittsburgh furnace	$19.00

Charcoal

Lake Superior furnace	$22.00
Delivered Chicago	25.2528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto.

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$75.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	130.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$22.75

For each additional 0.5% silicon up to 12%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$27.75
10.51 to 11.00%	28.25
11.00 to 11.50%	28.75
11.51 to 12.00%	29.25
12.01 to 12.50%	29.75
12.51 to 13.00%	30.25
13.01 to 13.50%	30.75
13.51 to 14.00%	31.25
14.01 to 14.50%	31.75
14.51 to 15.00%	32.25
15.01 to 15.50%	32.75
15.51 to 16.00%	33.25
16.01 to 16.50%	33.75
16.51 to 17.00%	34.25

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry Spain or Algeria	10.25c.
Iron, low phos., Swedish, average, 68½% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	26c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	26c.
Man., Brazilian, 46 to 48½%	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered, nominal	16.00
Tungsten, domestic, scheelite delivered, nominal	16.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.50 to 17.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic ports	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00
Domestic, barge and rail	19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	5.00c.
Del'd Ch'go, No. 5 industrial	3.77c.
F.o.b. Cleveland, No. 3 distillate	6.00c.
F.o.b. Cleveland, No. 5 industrial	5.00c.

COKE AND COAL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville Prompt	$3.50 to $3.65
Foundry, f.o.b. Connellsville Prompt	4.00 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	11.50
Foundry, by-product, del'd Newark or Jersey City	9.65
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, delivered Cleveland	9.75
Foundry, by-product, delivered Cincinnati	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

FOR *High Quality Steels*

NIAGARA
BRAND
FERRO-ALLOYS

PITTSBURGH METALLURGICAL CO., Inc.
NIAGARA FALLS NEW YORK

View of crowd in one section of the Wesley plant during open house.

Wesley Company Holds Open House

THE results of a four-year modernization program undertaken by one of the largest commercial metal treating plants in the country were sufficient inducements to attract over 6000 persons to the open house held recently by Wesley Steel Treating Co., 1333 West Pierce Street, Milwaukee.

What might have been just another plant tour was transformed into a gala affair which enabled the visitors to derive much enjoyment as well as practical information from their trip through the improved plant. Engineered and planned by Charles I. Wesley, son of Charles Wesley, Sr., founder and president of the company, the proceedings were proclaimed a success both from the company's and the guest's viewpoints.

No work was done in the plant the day of the celebration and customers were warned in advance to anticipate their requirements so that they would not be inconvenienced by the shut down. Since the Wesley company conducts a service business, all incompleted work remaining in the plant was stored in a warehouse prior to the day of the reception, as a protection to customers.

After cleaning up the shop and plant for the affair, explanatory signs were placed on each piece of equipment for the benefit of the visitors. Employees garbed in uniform shop coats and caps for the occasion were assigned to their posts at furnaces and other pieces of equipment where dummy jobs were worked on to illustrate processes of actual operation.

TRIPLE COMPRESSION
SCRAP BALERS

STYLE
100 TC
(100 x 51 x 36)
and other sizes

Also Regular
Double
Ram Presses
in all sizes

GALLAND-HENNING
MANUFACTURING COMPANY
2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Machine tool buying ignores scarcity theory.

o o o

. . . Orders are comfortably maintained.

o o o

. . . Germany enjoys marked increase in exports while domestic orders decline.

o o o

By L. M. WAITE

o o o

ANY review of the past nine months of machine tool buying indicates that a widely accepted return to former theories of competitive production has opened up potential markets which have been under impractical restraints for some little time. During the first six months of the current year, buying by the smaller and scattered shops has been increasingly persistent in full ranges of standard equipments.

Large buying programs, featuring special and semi-special machinery and tools, have indicated a reasserted intention of users to have more, better and cheaper mechanized equipment of convenience, such as the automobile and household utensils. In agricultural areas demand for modernized farm implements now necessitates that manufacturers shall go into line-production.

Likewise, determination to make use of competitive transportation facilities has made it incumbent upon railroad management to find the means for providing more and increased comfort for passengers, and greater speed in carrying both passengers and tonnage at lowered rates. This has brought about the commencement of constructive railroad spendings, with huge possibilities in payroll totals.

Cleveland

While miscellaneous demand for machine tools tapered somewhat during the week, the volume was fairly good. Activity is more brisk in the standard types of machines than in special purpose tools; orders for the smaller types of machines predominate. A fair amount of business in single units is coming from the automotive industry in the Michigan territory. Railroad and agricultural implement makers are buying forging equipment, as are manufacturers of small tools. Demand for boring mills is good. Presses are very active in orders, ranging from single machines up to several tools aggregating $50,000. This business is about evenly divided between automotive and other industries. Michigan press orders during the first half year were 50 per cent greater than during the corresponding 1935 period. Quick deliveries are being energetically sought, but while certain lines may be making headway against backlog, there is little, if any, general improvement in delivery conditions on full lines, A local maker of horizontal boring machines is quoting October delivery.

Cincinnati

Boring mill activity has stepped to the fore in both orders and inquiry. This, in connection with some planer ordering, has brought heavy tools to a higher level than last month. There were only minor changes in other demand during the first week of the second half-year. Lathes, millers and grinders remain steadily active. Drills and shapers continue to lag in orders. Demand is not confined to any particular area or industry. Inquiry is continuing brisk and the tone appears sincere.

Chicago

Vacations are drawing buyers from their desks and will continue to cause order postponements for four to six weeks. A number of tractor plants are on schedules in excess of automobile production. Another maker is turning to line production, experimentally employing equipment on hand. It is believed that results will be effective in the purchase of considerable special equipment to equalize this makers output with accomplishments in other tractor shops. It appears that changes in personnel in Rock Island management account for delay in the submission of lists. Quotations on railroad inquiries are slow in receiving final approval.

Detroit

The holiday period was generally observed and was effective in a rather inactive machine tool week. A number of automotive plant contracts have been let for the rebuilding of equipments now in operation. Departments affected will be turned over to change-over crews at the end of present runs. Postponement of considerable ordering is still the policy of the day. This is certain to aggravate delivery conditions when buyers go into action. Machine tool manufacturers are stressing skilled labor shortage in an effort to break the order barrier.

Germany

Improvement continues in Germany's machine tool industry. The gain is reported by the Department of Commerce as featuring less domestic demand than in 1935, and increased purchases by Russia, Italy, France, the United Kingdom, Sweden and Brazil. The number of units sold in the first four months was more than double those sold in the corresponding 1935 period, while the total weight of units showed an increase of only 50 per cent, indicating shipments of smaller machine units such as lathes, drilling machines, presses and the lighter automatic equipments. In dollar value the increase was some $5,000,000.

PLANT EXPANSION AND EQUIPMENT BUYING

. . . Quaker States Oil Refining Co., Oil City, Pa., has let contract for an addition to its oil refinery at Farmers Valley, Pa., to cost $500,000 with equipment.

o o o

. . . Cleveland Twist Drill Co., Cleveland, plans an expenditure of $500,000 for plant expansion and equipment.

o o o

. . . Tubize Chatillon Corp., New York, plans expansion and improvements at its mills at Rome, Ga., and Hopewell, Va., to cost $2,800,000.

NORTH ATLANTIC

Tubize Chatillon Corp., 2 Park Avenue, New York, manufacturer of viscose rayon products, plans extension and improvements at mill at Rome, Ga., to increase capacity about 50 per cent, comprising one and multi-story units, extensions in power house and water supply system, and other utilities. Company will also carry out extensions at Hopewell, Va., mill. Entire project will cost about $2,800,000 with equipment. R. C. Jones is manager at Rome mill. Company is arranging for immediate financing in sum noted for project.

Star Corrugated Box Co., Inc., Maspeth, L. I., has let general contract to J. K. Turton Co., Grand Central Terminal, New York, for two-story addition. Cost close to $100,000 with machinery. Project will be carried out in name of Starcor Realty Co., address noted, a subsidiary. L. Davidson, 55 West Forty-second Street, New York, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 14 for 29 pneumatic portable grinders for Brooklyn and Philadelphia Navy yards, and for six pneumatic chipping hammers for San Diego Naval Station (Schedule 8311); until July 17, eight motor-driven pumping units and spare parts (Schedule 8349), main reduction gears and turning gears and spare parts (Schedule 8312), impulse blading and blading materials (Schedule 8370) for Brooklyn yard.

Ever Ready Machinists, Inc., 10 Peck Slip, New York, manufacturer of machinery and parts, has leased building at 137 West Nineteenth Street for new plant.

Solvay Process Co., 40 Rector Street, New York, manufacturer of industrial chemicals, alkalies, etc., plans addition to main plant at Solvay, N. Y., primarily for production of sodium bicarbonate and similar specialties. Cost close to $1,000,000 with machinery. Company is affiliated with Allied Chemical & Dye Corp., New York.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until July 13 for one test set, communication cable (Circular 4); until July 24, 10,000 ft. of twisted pair transmission line wire, 10,000 ft. antenna wire, 100 transposition blocks, fuses, etc. (Circular 3).

American Can Co., 230 Park Avenue, New York, is acquiring about one acre tract at Houston, Tex., for new branch plant, work to begin early in fall. It will be operated by American Can Co. of Louisiana, a subsidiary. Cost over $600,000 with equipment. C. G. Preis is chief engineer, first noted address.

International Nickel Co., 67 Wall Street, New York, has let general contract to Fraser Brace Engineering Co., Ltd., 107 Craig Street West, Montreal, for additions to electrolytic nickel refinery at Port Colborne, Ont., each one-story, 100 x 800 ft., and 100 x 300 ft. respectively, for an electrolytic unit and for storage and distributing building. Same contractor has secured award for rebuilding one-story plant, 95 x 235 ft., of Whitehead Metal Products, Ltd., Port Colborne, a subsidiary, recently destroyed by fire. Entire project will cost close to $2,000,000 with machinery.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until July 13 for 101 steel plate buoys, welded construction, each with cast steel bottom counterweight.

Newark Pulley, Bearing & Belt Co., 9 Keen Street, Paterson, N. J., a subsidiary of Bernstein Brothers, Inc., same address, has leased property at 215 Frelinghuysen Avenue, Newark, N. J., for plant.

State Purchase Commissioner, State House, West State Street, Trenton, N. J., asks bids until July 13 for galvanized wrought iron electric conduit.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until July 28 for one six-spindle drill press (Circular 562); until July 30, one universal milling machine (Circular 580).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 17 for steel flanges (Schedule 8340), steel valves (Schedule 8342), one motor-driven knife grinder (Schedule 8353) for Philadelphia Navy Yard.

Bond Mfg. Co., Fourteenth and Thatcher Streets, Wilmington, Del., manufacturer of metal bottle caps, seals, etc., has asked bids on general contract for one-story addition. Cost close to $50,000 with equipment. Roberts, Stanhope & Manning Architects, Inc., Equitable Building, is architect.

NEW ENGLAND

Readville Distilleries, Inc., 31 Milk Street, Boston, has asked bids on general contract for three-story and basement addition to distillery at Readville, Mass., 50 x 200 ft., for storage and distribution. Cost about $75,000 with equipment.

Colonial Beacon Oil Co., 376 Stuart Street, Boston, has filed plans for rebuilding bulk oil storage and distributing plant at Hartford, including installation of two steel tanks and other equipment. Cost close to $30,000.

Homer D. Bronson Co., Beacon Falls, Conn., manufacturer of automobile hardware, sheet metal stampings, etc., has let general contract to Torrington Building Co., Torrington, Conn., for two-story addition, 50 x 84 ft. Cost over $40,000 with equipment.

United Illuminating Co., New Haven, Conn., has let general contract to Mott-Mohr Construction Co., 440 Elm Street, for additions to steam-electric generating plant at Steel Point, Bridgeport, Conn. Cost over $100,000 with equipment. Westcott & Mapes, Inc., New Haven, is architect and engineer.

Herreshoff Mfg. Co., Burnside Street, Bristol, R. I., manufacturer of motor boats and other type vessels, has let contract to International Steel Co., Evansville, Ind., for structural steel for one-story addition, 105 x 260 ft., for storage and distribution. Cost about $60,000 with equipment.

Landers, Frary & Clark, New Britain, Conn., closed bids July 6 for a six-story plant addition, 60 x 300 ft. W. F. Brooks, Lewis and Gold Streets, Hartford, is architect.

BUFFALO DISTRICT

General Electric Co., Genesee Building, Buffalo, will make extensions and improvements in Buffalo lamp works, closed since 1932, including reconditioning of equipment, preparatory to resuming operations early in fall, specializing largely in production of automobile lamps. Facilities will be provided for employment of about 200 workers.

Oneida Community, Ltd., Sherrill, N. Y., manufacturer of silverware, animal traps, etc., has let general contract to M. C. Morgan, Kenwood, N. Y., for two-story addition, 50 x 240 ft., primarily for storage and distribution. Cost about $60,000 with equipment. E. D. Pitt, Kenwood, is architect.

Truck Equipment Co., 1791 Fillmore Avenue, Buffalo, manufacturer of motor truck equipment, parts, etc., has leased one-story building on Thirty-seventh Street, Long Island City, New York, about 10,000 sq. ft., floor space, for factory branch, service and distributing works.

SOUTH CENTRAL

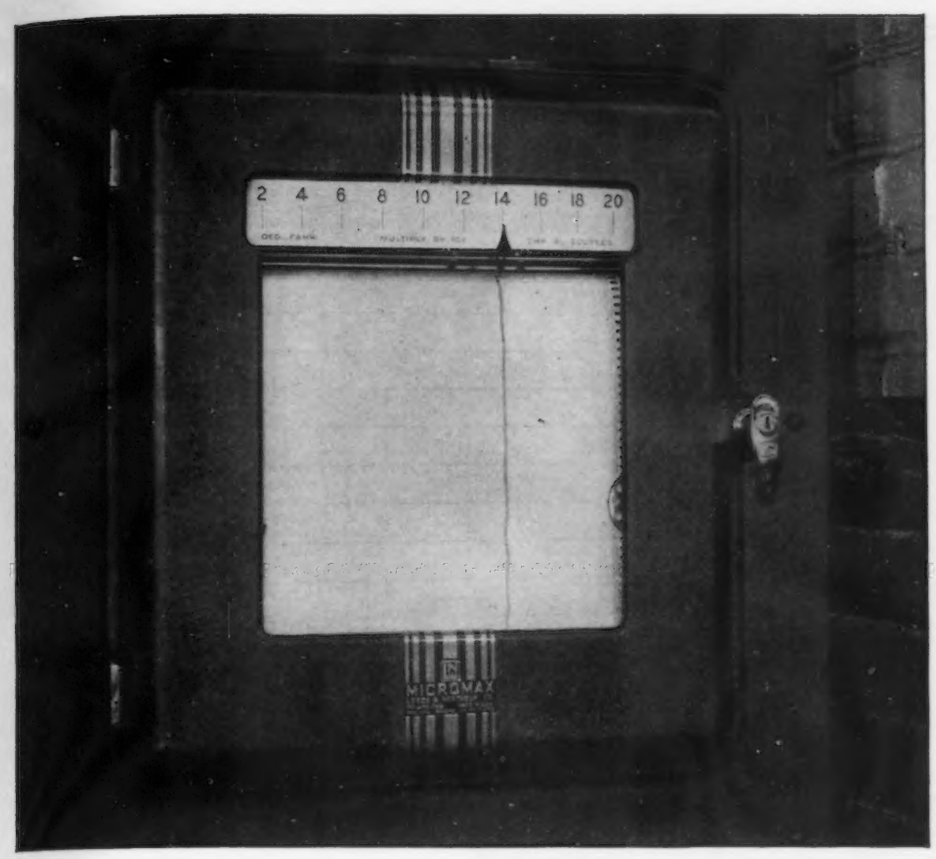
Magnolia Sugar Co-operative, Inc., Citizens Bank Building, Houma, La., has let general contract to Pittman Brothers Co., 2800 North Galvez Street, New Orleans, for new sugar refinery at Minerva, La., with main unit one-story, 100 x 180 ft., and several smaller units, including storage and distributing buildings. Cost about $150,000 with machinery. H. N. Moody, 823 Perdido Street, New Orleans, is consulting engineer.

Jakes Foundry Co., 2800 Charlotte Avenue, West Nashville, Tenn., Edward Jakes, head, plans rebuilding part of plant recently destroyed by fire. Loss about $45,000 with equipment.

Woodford County Distillery Co., Midway, Ky., Earl Fowler, Lexington, Ky., secretary, recently organized, has approved plans for new distillery near Midway, comprising one-story units, with power house, machine shop and other mechanical departments. Cost close to $90,000 with machinery.

United States Engineer Office, Vicksburg, Miss., asks bids until July 27 for 135 steel boiler tubes, 2½-in. diameter, 11 ft. 7¾ in. long (Circular 331).

Crummies Creek Coal Co., Harlan, Ky., plans rebuilding coal-mining plant, including tipple and other facilities, recently



PYROMETER MAINTENANCE HITS A NEW LOW IN SILVER-ANNIVERSARY MICROMAX

Silver-Anniversary Micromax does Industry's outstanding job of indicating, recording, signalling and controlling — and does it at outstandingly low cost for maintenance. Micromax recorders have always been noted for economical operation, but this Silver-Anniversary Model sets a new economy level because servicing is greatly reduced.

Pen is filled only once in 7 weeks; feeds ink smoothly and evenly; has no capillary tube and hence seldom needs cleaning.

Chart-drive-reroll is positively aligned on its own frame casting, which can swing away from the main frame, and make the chart guides instantly accessible from both sides. A 40-yard roll of chart snaps into place; the paper is drawn beneath the guides and fastened to the re-roll — all in a few seconds.

Standardizing is entirely automatic; this eliminates an easily-forgotten service adjustment, permits use of low-cost dry cell, keeps measuring circuit always at correct voltage. Only one cell is used.

Construction throughout is according to the standards for fine machinery. Material for each part is selected to meet the requirements of the part; heat-treatment by the Triple-Control Hump Method is freely used. Tolerances, fits and safety factors are the same as those of a machine tool. The entire instrument is built substantially to operate smoothly, accurately and dependably under hard, continuous service.

Send for this New Catalog

It describes the Silver-Anniversary Micromax and all other members of the Micromax Line

LEEDS & NORTHRUP COMPANY
4956 STENTON AVENUE PHILADELPHIA, PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

J-N33A(8)

destroyed by fire. Loss over $80,000 with machinery.

City Council, Holly Springs, Miss., plans about 50 miles of transmission and distributing lines for rural electrification. Fund of $50,000 is being arranged through Federal aid. George M. Buchanan, mayor, is active in project.

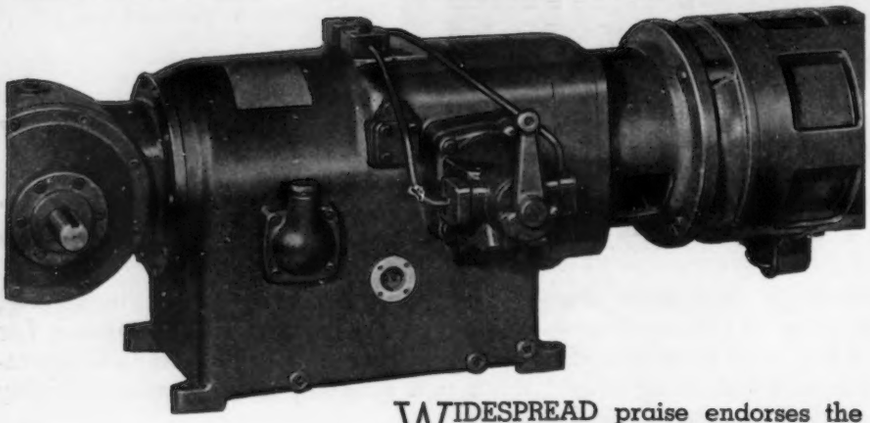
WASHINGTON DIST.

American Brewery, Inc., 1700 North Gay Street, Baltimore, has let general contract to Frainie Brothers, 19 West Franklin Street, for one-story addition. Cost over $45,000 with equipment. Shattuck & Layer, 221 North La Salle Street, Chicago, are architects.

General Purchasing Officer, Panama Canal, 1435 K Street, N. W., Washington, asks bids until July 14 for one ball bearing bench grinder, reamers, hand taps, ring bolts, eye bolts, galvanized wire rope clips, turnbuckles, chain shackles, grommets, adjustable pipe wrenches, 24 machinists' bench vises, 60 sledge-hammers, 288 hand scoops, 720 ship scrapers, 100,000 ft. copper wire, 50,000 ft. solid-tinned copper wire, rubber-insulated cable, telephone cable, magnet wire, 600 lb. copper connecting wire, 13,500 ft. copper cable and other equipment (Schedule 3160).

Craig Co-operative Electric Co., Oriskany, Va., plans new diesel engine-electric power plant in connection with transmission and distributing lines for rural electrification in parts of Craig and Botetourt Counties, including service facilities. Fund of $99,000 has been secured through Federal aid for initial work.

"THE FINEST WE HAVE EVER USED"



WIDESPREAD praise endorses the New Oilgear *Fluid Power* Variable Speed Transmission. Production men say its performance amazes them. It provides hairline accuracy of speed control; steplessly variable speed; even, positive speeds; smooth acceleration and reverse; a complete range of automatic and hand operation. The new simplified design makes Oilgear compact, widely adaptable and low in price. You will want full information about the transmission that is upsetting production figures in many lines. Bulletin 60000 sent free. THE OILGEAR COMPANY, 1311 W. Bruce St., Milwaukee, Wisc.

- ★ Smooth Acceleration and Deceleration
- ★ Accurate Stepless Speed Control . . . Minimum to Maximum in either direction
- ★ Automatic Load Indication and Overload Protection
- ★ Flexible Location with Hand, Automatic or Remote Control
- ★ High Efficiency, Low Maintenance
- ★ Smaller Size, Lower Cost

OILGEAR

Fluid Power

VARIABLE SPEED TRANSMISSIONS

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until July 17 for replacement parts for engine-generator electric lighting plants (Proposal 28100).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 14 for one motor-driven wood-working lathe (Schedule 8355), seamless steel tubing (Schedule 8284), electric drills, electric grinders, electric hammers and electric sanders (Schedule 8303) for Eastern and Western Navy yards; four industrial tractors (Schedule 8348) for Sewell's Point, New York and Philadelphia yards; until July 17, one motor-driven drilling and tapping machine (Schedule 8364) for Norfolk, Va., yard; one tension machine, and compression and transverse testing machine (Schedule 8357) for Portsmouth, Va., yard; one motor-driven milling machine (Schedule 8351) for Washington yard; one vertical tubular boiler (Schedule 8374) for Sewell's Point yard; 20,300 sq. ft., galvanized wire netting (Schedule 8331) for Sewell's Point and Mare Island yards; seamless copper tubing (Schedule 8335), about 63,000 lb. steel wool (Schedule 8313), hacksaw frames (Schedule 7775) for Eastern and Western yards.

OHIO AND INDIANA

American Coach & Body Co., 3809 Clark Avenue, S.W., Cleveland, manufacturer of special bodies for automobiles and trucks, truck transmission equipment, power winches, etc., has acquired part of former local plant of Peerless Motor Car Co., comprising a three-story building of 168,000 sq. ft. floor space. Structure will be remodeled for main works, with removal of present plant to new location and capacity increased. Company is disposing of stock issue to total about $200,000, fund to be used for project.

Standard Register Co., 107 Campbell Street, Dayton, Ohio, manufacturer of printing machinery and parts, has plans for one-story addition, 150 x 180 ft. Cost over $150,000 with equipment. Company is also planning extensions and improvements in steam power house, including new equipment. Austin Co., Cleveland, is architect and engineer.

Patterson Foundry & Machine Co., East Liverpool, Ohio, has let contract to Guibert Steel Co., Pittsburgh, for steel framing for one-story addition, 130 x 170 ft., adjoining present machine shop. Equipment installation will include traveling cranes and other mechanical-handling machinery. Cost over $75,000 with equipment. Company has acquired ball grinder and mixing machinery business of A. & F. Brown Co., Elizabeth, N. J., and will consolidate, manufacturing such equipment in future at East Liverpool works.

Clark Controller Co., 1146 East 152nd Street, Cleveland, manufacturer of electric controllers and kindred equipment, has let general contract to J. L. Hunting Co., Chester-Ninth Street Building, for one-story addition, 30 x 160 ft., for expansion in assembling and stock divisions; also for steam power house. Cost over $65,000 with equipment. This is third expansion made at plant since first of year. Edward G. Hoefler, 5005 Euclid Avenue, is consulting engineer.

Contracting Officer, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until July 13 for one 1000-lb. trolley and hoist, and for two turntables and 30 hangars (Circular 1033); until July 17, 200 gun control switch assemblies (Circular 1023), six fuel system unit assemblies (Circular 1028); until July 20, 1400 sight assemblies, different types (Circular 1035).

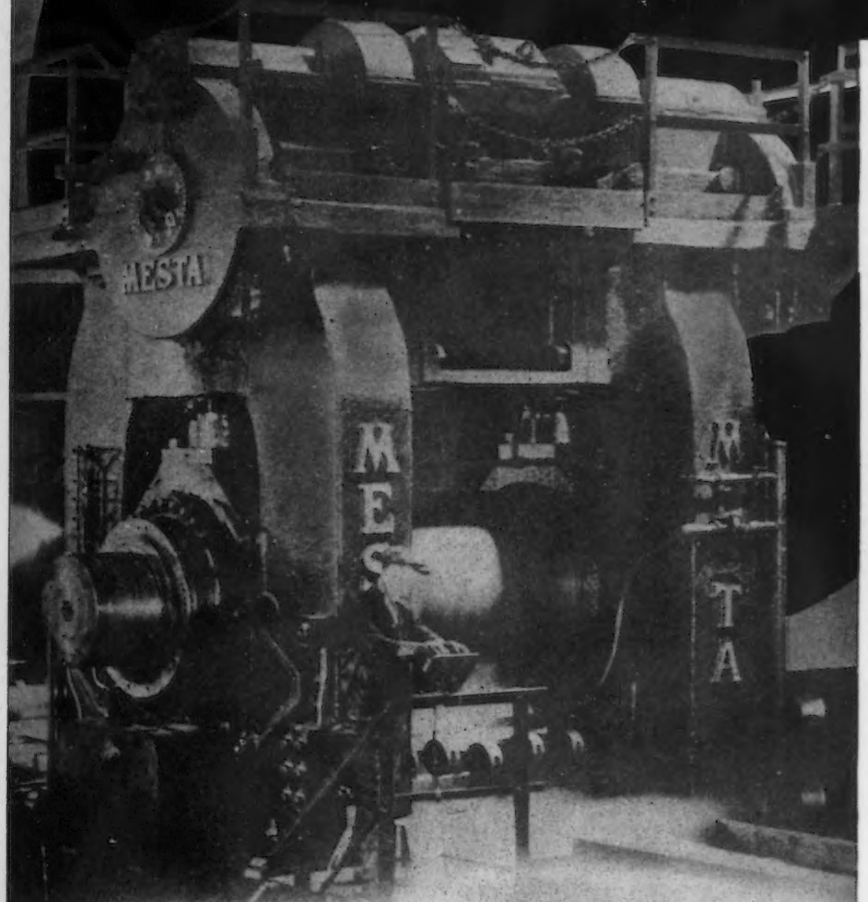
Belden Mfg. Co., Richmond, Ind., manufacturer of electric wires and cables, etc., has let general contract to John W. Mueller, 42 South Ninth Street, for one-story and basement addition, primarily for storage and distribution. Cost about $30,000 with equipment. Main offices are at 4647 West Van Buren Street, Chicago.

Cleveland Twist Drill Co., Cleveland, will enlarge its plant by erection of a five-story building providing 106,000 sq. ft. floor space. Cost of expansion is $400,000 for building and $100,000 for equipment. George S. Ryder Co., Cleveland, is engineer.

Receivers of Relay Motors Corp., Lima, Ohio, have engaged Samuel T. Freeman

MESTA

BACKING UP ROLLS

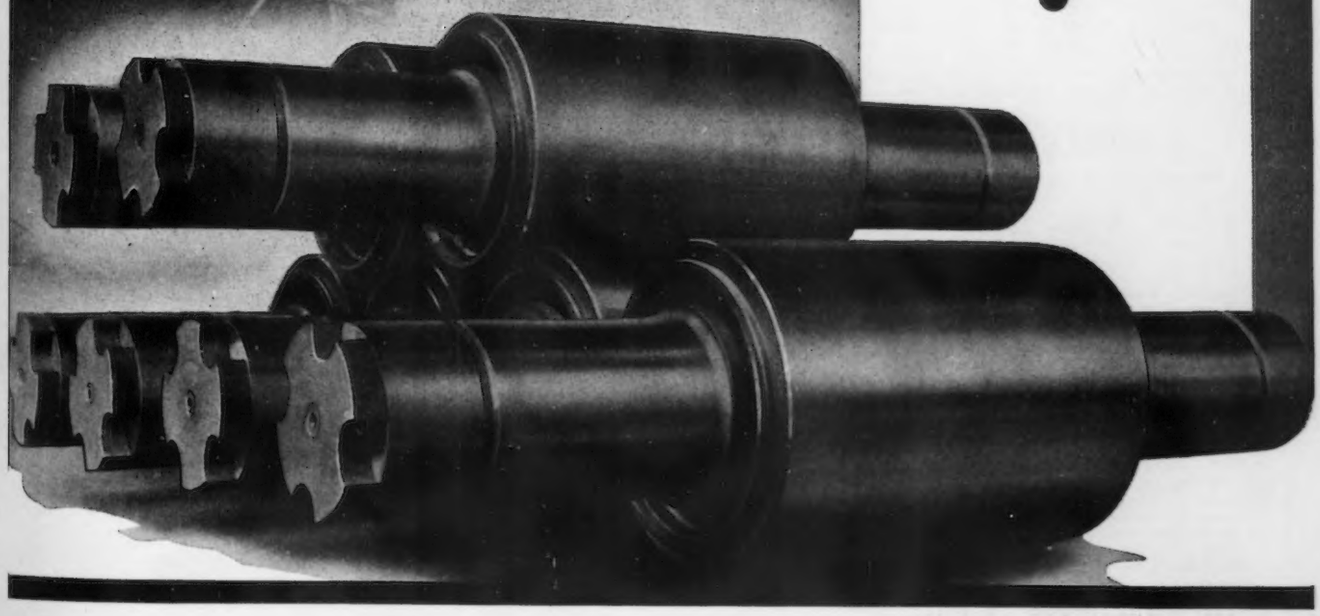


DEPENDABLE,
UNIFORM
QUALITY

Year after Year

MESTA MACHINE CO.

PITTSBURGH, PA.



& Co., 27 William Street, New York, to sell at public auction, July 22, 23 and 24, all machinery and equipment of Relay corporation. Sale will be conducted at Lima plant and includes 400 machine tools. Company's real estate was recently sold to Westinghouse Electric & Mfg. Co., East Pittsburgh.

WESTERN PA. DIST.

Wheeling Mold & Foundry Co., Wheeling, W. Va., plans extensions and improvements in machine works, including new machinery and modernizing of present equipment. Cost about $100,000. Company is a unit of Continental Roll & Steel Foundry Co., East Chicago, Ind.

Quaker State Oil Refining Co., Chambers Building, Oil City, Pa., has let contract to E. B. Badger & Sons Co., 271 Madison Avenue, New York, for addition to oil refinery at Farmers Valley, Pa., and improvements in present plant. New solvent dewaxing plant will be installed for removal of wax from lubricating oil stocks. Entire project will cost about $500,000 with machinery. G. H. Hunter is general superintendent of plants.

Porcelier Mfg. Co., Greensburg, Pa., manufacturer of electric lighting fixtures and equipment, has asked bids on general contract for one-story addition, 40 x 125 ft. Cost over $50,000 with equipment. Rubin & Ve Shancey, Union Trust Building, Pittsburgh, are architects.

MICHIGAN DISTRICT

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of steel automobile bodies, has let general contract to Martin-Krausmann Co., 955 East Jefferson Street, for four-story and basement addition, 75 x 150 ft. Cost close to $175,000 with equipment. Albert Kahn, Inc., New Center Building, is architect and engineer.

Bower Roller Bearing Co., 3040 Hart Street, Detroit, has let general contract to O. W. Burke Co., Fisher Building, for one-story addition. Cost close to $30,000 with equipment.

Buick Motor Co., Flint, Mich., a unit of General Motors Corp., has authorized plans for five one-story additions, totaling about 400,000 sq. ft. floor space, for expansion in parts, assembling and other divisions. Cost close to $1,500,000 with machinery.

Detroit Forging Co., 3564 Toledo Avenue, Detroit, plans one and two-story addition for increase in present output. Cost over $125,000 with equipment.

Central Refinery Co., St. Louis, Mich., has been acquired by new interests headed by Thomas De Sonia, Kilgore, Tex., and associates. Improvements will be made, with facilities for handling about 500 bbl. of crude oil daily. Work is scheduled for completion in about 30 days.

United Stove Co., Ypsilanti, Mich., has let general contract to Austin Co., Detroit, for one-story addition, 80 x 250 ft. Cost close to $100,000 with equipment.

Flint Hill Brewing Co., Flint, Mich., plans expansion and improvements, including installation of equipment. Company has arranged stock issue of $100,000, part of fund to be used for purpose noted.

MIDDLE WEST

Federal Pipe & Supply Co., 900 South Campbell Avenue, Chicago, has let general contract to A. Herlin & Son, 6816 Clyde Avenue, for one-story addition, 84 x 314 ft., primarily for storage and distribution. Cost over $50,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

Campbell Soup Co., 2550 West Thirty-fifth Street, Chicago, has let general contract to Campbell-Lowrie-Lautermilch Co., 400 West Madison Street, for one-story addition, 36 x 180 ft., for new can-cooling and mechanical division. Cost close to $80,000 with equipment. Battey & Kipp, Inc., 231 South LaSalle Street, is architect and engineer. Main offices of company are at Camden, N. J.

Flintkote Co., 624 South Michigan Avenue, Chicago, manufacturer of roofing products, plans two-story addition to plant on Seventeenth Street, 120 x 160 ft. Cost over $150,000 with equipment. Architect is being selected to prepare detailed plans.

Union Pacific Railroad Co., Fifteenth Street and Farnam Avenue, Omaha, Neb., plans one-story addition to machine shop at car and locomotive repair works, North Platte, Neb., 120 x 250 ft. Cost over $90,000 with equipment.

State Board of Administration, Capitol Building, Bismarck, N. D., has rejected bids recently received for addition to power house at State normal school, Dickinson, N. D., including equipment, and will take new bids soon. Cost about $60,000 with equipment. William F. Kurke, 117 Thirteenth Avenue North, Fargo, N. D., is architect.

Klauer Mfg. Co., Ninth and Washington Streets, Dubuque, Iowa, manufacturer of iron castings, sheet metal stampings, etc., has let general contract to R. F. Conlon Sons Construction Co., Federal Bank Building, for one-story addition, 100 x 240 ft. Cost over $70,000 with equipment.

Iowa Electric Co., Cedar Rapids, Iowa, plans new artificial gas plant at Fairfield, Iowa, water-gas type, with pipe lines for distribution. Cost about $90,000 with equipment.

United States Engineer Office, Federal Building, Milwaukee, asks bids until July 15 for one 5-cu. yd. alloy-steel dredge dipper, complete with teeth, bail and braces to dipper handle (Circular 260).

Purchasing Agent. Bureau of Reclamation, Denver, asks bids until July 29 for 70 black or industrial diamonds (Req. 20534-B).

SOUTH ATLANTIC

Bartlett Clamp & Truck Co., Lake Alfred, Fla., manufacturer of mechanical equipment, has leased building near Highway 17, Lakeland, Fla., and will remodel for new plant, removing present works to new location and increasing capacity.

City Utilities Commission, Jacksonville, Fla., Ernest E. Anders, chief, plans extensions and improvements in municipal electric power plant, including additional equipment. Fund of $900,000 is being arranged through Federal aid. This is part of project at plant, including transmission and distributing lines, with ultimate cost of about $2,000,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 17 for two motor-driven drilling and tapping machines (Schedule 8356), two motor-driven drilling machines (Schedule 8365) for Charleston, S. C., Navy Yard.

SOUTHWEST

Board of Education, Library Building, Kansas City, Kan., asks bids until July 27 for mechanical and other equipment for Wyandotte high school, including steel lockers, refrigerating machinery, etc. Hamilton, Fellows & Nedved, Tower Court, Chicago, are architects; Joseph W. Radotinsky, Commercial National Bank Building, Kansas City, Kan., is associate architect.

LeStourgeon-Brooks Co., 1147 South Quaker Avenue, Tulsa, Okla., food products packer, plans extensions and improvements in plant, known as Brooks Packing Co., including additional equipment. Cost over $50,000 with equipment.

Topeka Flour Mills Co., 126 North Jefferson Street, Topeka, Kan., has let general contract to Chalmers & Borton, Hutchinson, Kan., for one-story addition, 75 x 250 ft., for storage and distribution. Cost over $75,000 with mechanical-handling and other equipment.

City Council, Columbia, Mo., has plans for extensions and improvements in municipal electric power plant, including new 5000-kva. turbo-generator unit with accessories, 750-hp. high-pressure boiler, condenser and auxiliary equipment. Cost about $280,000. Financing has been arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., plans manual training department in two-story and basement high school at Kelly Avenue and Thirty-second Street, for which superstructure will begin soon. Cost about $300,000. Layton & Forsyth, Braniff Building, are architects.

Texas Refining Co., Greenville, Tex., plans rebuilding part of oil refinery recently destroyed by fire. Loss over $50,000 with equipment.

City Council, Temple, Tex., will arrange early special election to approve bonds for $800,000 for new municipal electric power plant, and will take bids soon for four 1200-hp. diesel engine-generator units and accessory equipment, distributing lines, power substation facilities, etc. Garrett Engineering Co., Houston, Tex., is consulting engineer.

PACIFIC COAST

Samson Tire & Rubber Corp., 5725 Anaheim Avenue, Los Angeles, a division of United States Rubber Co., New York, plans expansion, including one-story units and installation of new equipment. Cost over $100,000 with machinery.

Bureau of Reclamation, Denver, asks bids until July 20 for steel control gates and appurtenances, and cast iron gates for installation in surge tank, division works, Ogden Canyon conduit, Ogden River Project, Utah (Specifications 812-D).

Board of Education, Bakersfield, Cal., will soon take bids on general contract for one-story industrial arts unit to Emerson school. Cost about $120,000 with equipment. C. H. Biggar, Haberfelde Building, is architect.

Claussen & Claussen, Guardian Building, Portland, architects, have let general contract to A. C. Meyer, 5134 North Albina Street, for one-story tool and mechanical equipment works, 50 x 100 ft., at East Ninth and Main Streets, for company whose name is temporarily withheld. Cost about $30,000 with equipment.

Soundview Pulp Co., Everett, Wash., manufacturer of bleached sulphite pulp, has plans for a group of one-story structures to be known as Unit No. 2, to increase capacity from 6000 to 9500 tons per month. Cost close to $2,000,000 with machinery. Sale of stock and bond issues has been authorized to provide funds in such amount. Hardy S. Ferguson & Co., 200 Fifth Avenue, are consulting engineers. L. S. Burdon is general manager at mill.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 17 for ball bearings (Schedule 8287); until July 17, 100 acetylene gas cylinders, each 225 cu. ft. capacity (Schedule 8338) for Mare Island Navy Yard; one battery-charging outfit (Schedule 8322) for Hawthorne, Nev., Naval Station; three 1200-lb. and three 500-lb. platform scales, and 24 240-lb. platform counter scales (Schedule 8296), wire rope clips (Schedule 8299) for Mare Island, Puget Sound, Sewell's Point and other yards.

General Petroleum Corp. of California, Inc., 1519 Railroad Street, Seattle, has let general contract to J. W. Bailey, Insurance Building, for extensions and improvements in bulk oil plant at 1710 Sixteenth Street, S. W. Cost about $40,000 with steel tanks and other equipment.

FOREIGN

F. Hills & Sons, Ltd., Trafford Park, Manchester, England, recently organized, plans new works for manufacture of small type aircraft, particularly monoplanes, including parts production and assembling. Cost over $100,000 with equipment. Company has recently secured manufacturing rights to new type airplane unit in Great Britain from a company in Czechoslovakia.

Economic Ministry, Government of Mexico, Mexico, D. F., plans four commercial fertilizer works in Tiacolulua district, Oaxaca State, to be operated under Federal direction, with power stations, machine shops and other mechanical departments. One of plants will use hydro-electric power for operation and power development will be carried out for this purpose, probably on Tomates River. Fund of 6,000,000 pesos (about $840,000) is being arranged for project.

Board of Harbour Commissioners, Motruoa, Newton King Wharf, New Plymouth, New Zealand, asks bids until Aug. 27 for one 2-ton portal electric traveling crane, complete with operating mechanism and spare parts.